Comments on

Hazard Ranking System Documentation Record

for the
Proposed Listing of
Terry Creek Dredge Spoil Areas/Hercules Outfall,
EPA ID No. GAD982112658
(Dated January 31, 1997)
on the National Priorities List

by
U.S. Army Corps of Engineers, Savannah District
100 W. Oglethorpe
Post Office Box 889
Savannah Georgia 31402-0889

Comments made: 4 September 1997

Comments by U.S. Army Corps of Engineers on HRS Documentation Record
Terry Creek Dredge Spoil Areas/Hercules Outfall,
EPA ID No. GAD982112658
(dated January 31, 1997)

1. Introduction

The Corps of Engineers as an agency has more than one function. We provide engineering and environmental expertise to military facilities; we regulate wetlands and navigable waters; and we manage 11.7 million acres of public lands and surface waters and more than 25,000 miles of navigable waterways in our Civil Works program. Our Civil Works program (which includes the "Terry Creek Dredge Spoil Area") includes the maintenance of the nation's ___ waterways; other Corps missions include the management of natural resources on our millions of acres, and our newest mission: environmental protection and restoration (which is ecosystem restoration through hydrologic modification.)

The Corps of Engineers has become a premiere agency in the last several decades in the protection of the environment. We started working on SUPERFUND projects with EPA in 1990 and have provided technical support in a variety of ways over the past 7 years. Savannah District is one of ten Corps of Engineers districts originally designated as "Hazardous, Toxic and Radioactive Waste Design Districts." We are committed to excellence in both engineering and environmental management and are ready to assist EPA in any way appropriate relative to Terry and Dupree Creeks.

In preparing these comments, we wish to note that our primary goal is to assure an accurate record is established, and accurate scores applied. To this end, we have provided information and identified inaccuracies in the Hazard Ranking System (HRS) document that may not necessarily affect the overall score, but are pertinent to the factual history of the site. We have also included explanations about dredging operations and confined dredged material disposal areas in an attempt to provide EPA and others with a better understanding of the actions and issues related to this site.

Our comments (below) are organized in the same manner as the HRS document is organized. Blue comment pages are inserted into the body of the HRS document for your ease in reference and understanding. In simple cases, we have marked corrections in red ink on the white HRS document page.

Please contact District Environmental Compliance Coordinator Kathie Morgan at 912-652-5018 if you have any questions regarding these comments.

2. General Comments

2.1 *Source of Contamination for Dredge Material Disposal Areas:* We note that both the studies done in 1996 and the scoring done in 1997 focus entirely on the dredged material disposal areas and Hercules outfall, altogether omitting the creeks. The creeks are the source of contamination for the dredged material disposal areas and for the surrounding waters and wetlands affected by tidal flow from Terry and Dupree Creeks. **This is not clearly stated anywhere in the document and does not seem to have been acknowledged during several key portions of the evaluation.**

2.2 *Arbitrary Site Boundary:* The circle drawn around the "site" on Figure #1 (page 2) of the document appears to be arbitrary. It appears to not take into consideration the watersheds, marsh areas, and/or development within the proposed site. A properly established site boundary is based on data and known information. An appropriate boundary would establish a preliminary identification of the area of contamination as potentially affected by proximity to the discharge, creek outflow, tidal influence, etc.

2.3 *Combination of Four Geographically Separate Sites as a Single Site:* It is unusual for four sites to be assessed as if they were one site. For example, Source 3 (which is listed but not contaminated) elevates the score by having humans residing on site, while Source 1 elevates the score by having the largest quantity of material present. The assessment would reflect the actual risks of these various sites more accurately if they were assessed separately. By combining them as if they were contiguous, the site scorers may have inappropriately elevated the overall site score.

2.4 *Misquoted Corps Sources and Misinterpreted Corps Information:* We also noted several inconsistencies and/or errors in the scoring document and its primary reference report. Many Corps documents referenced were incorrectly quoted and/or misinterpreted. Although some of these errors may be minor, we have identified them to assure the most accurate record is kept regarding information on this site.

2.5 *Outdated Use of the Term "Spoil":* Although the term dredge "spoil" was used commonly in and before the early 1980s, the Corps and many others have shifted away from use of the term because of its connotation. many dredge disposal materials are clean sands (sometimes used for beach nourishment) and clean silts. Since the 1980s, we have used the term dredge "disposal material." We have used this more current terminology in our comments below.

2.6 *Incomplete Information and Lack of Evidence for All Assertions:* Also, HRS scoring information appears incomplete and inappropriately focused. Evidence used to constitute some scores is not clearly established. For some locations, it appears that EPA collected no

information beyond what was provided by the Corps and the State. Additional local research could have yielded background information needed to more accurately assess the site. We have described these errors in detail below.

NPL-U22-2-3-R4

HRS DOCUMENTATION RECORD -- REVISED COVER SHEET

Name of Site: Terry Creek Dredge Spoil Areas/Hercules Outfall
EPA ID № GAD982112658

Contact Persons

U.S. EPA, Region IV:	John McKeown	404/347-3555
Documentation Record:	Kristen Lombard Black & Veatch Special Projects, Corp.	770/594-2500

Pathways, Components or Threats Not Evaluated

The Groundwater Pathway will not be evaluated due to the low mobility value of the contaminant of concern, and the depth of the aquifer of concern.

The Air Pathway will not be evaluated due to limited targets in the immediate site vicinity.

HRS Documentation Record

Name of Site: Terry Creek Dredge Spoil Areas/Hercules Outfall
EPA ID Nº GAD982112658

EPA Region: 4

Date Prepared: 1/31/97

Street Address of Site: Tract 101E-3, Brunswick

County and State: Glynn County, Georgia

General Location in the State: Southeast Coast

Topographic Map: U.S. Geological Survey 7.5-minute series topographic quadrangle map for Brunswick East, Georgia, 1979 (photorevised 1988), (scale 1:24,000).

Source Nº 1
Latitude: 31° 09' 58" N

Longitude: 81° 28' 00" W

Source Nº 2
Latitude: 31° 09' 57" N

Longitude: 81° 28' 26" W

Source Nº 3
Latitude: 31° 09' 48" N

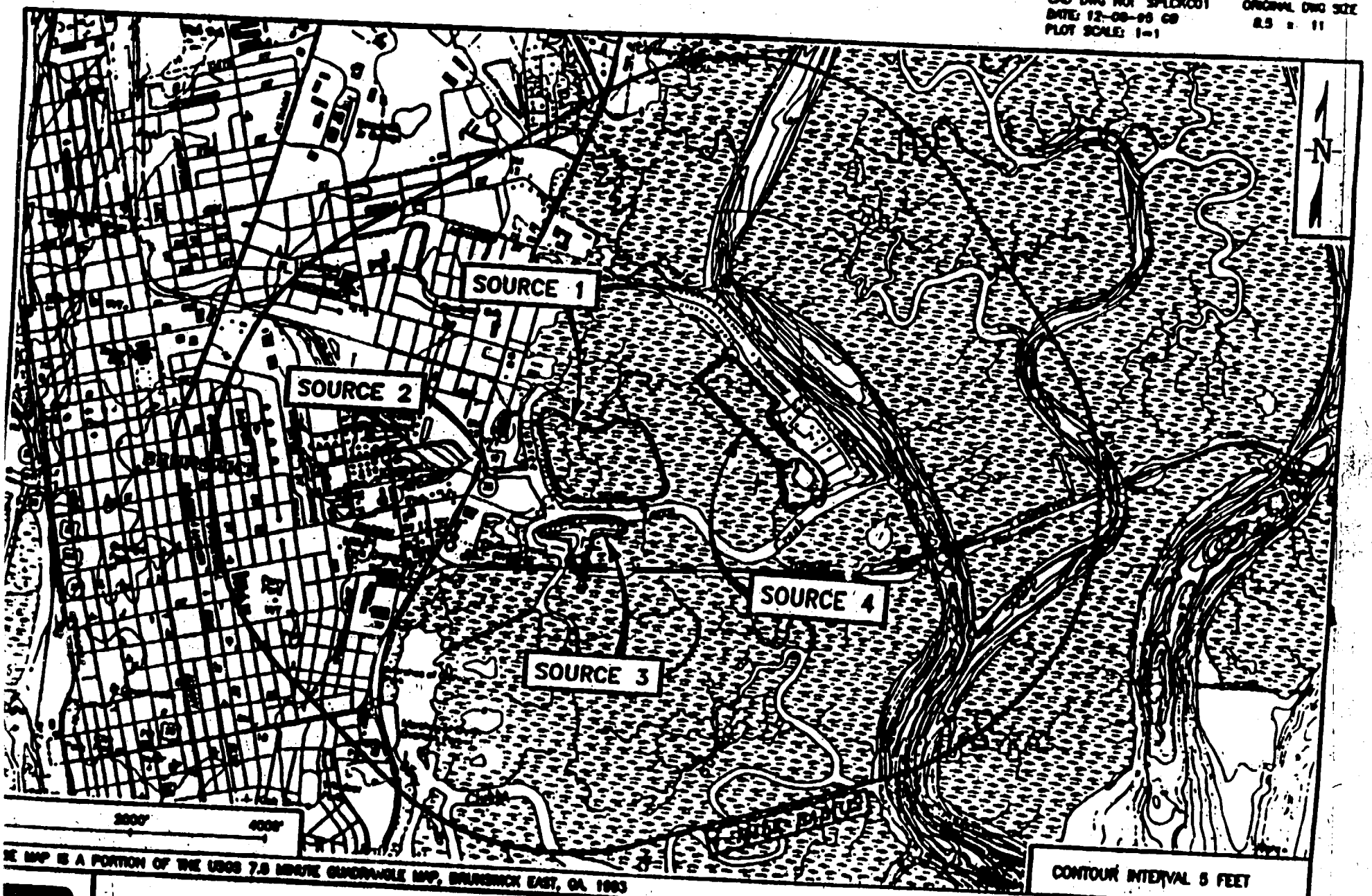
Longitude: 81° 28' 14" W

Source Nº 4
Latitude: 31° 10' 13" N

Longitude: 81° 27' 34" W

Scores

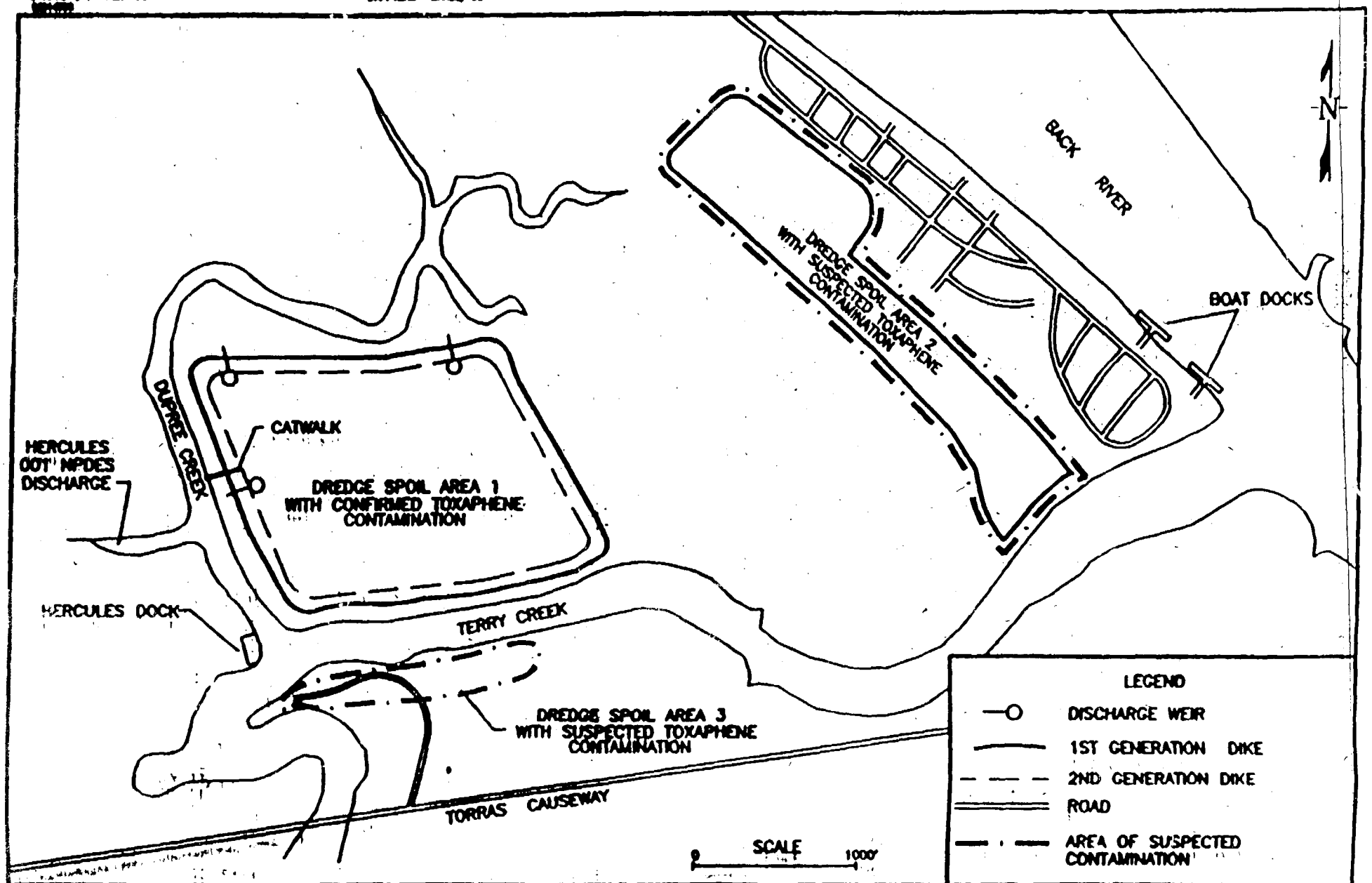
Ground Water Pathway		Not Scored
Surface Water Pathway	100	
Soil Exposure Pathway	8.47	
Air Pathway		Not Scored
HRS SITE SCORE		50.18



SITE MAP IS A PORTION OF THE USGS 7.5 MINUTE QUADRANGLE MAP, BRUNSWICK EAST, GA. 1993

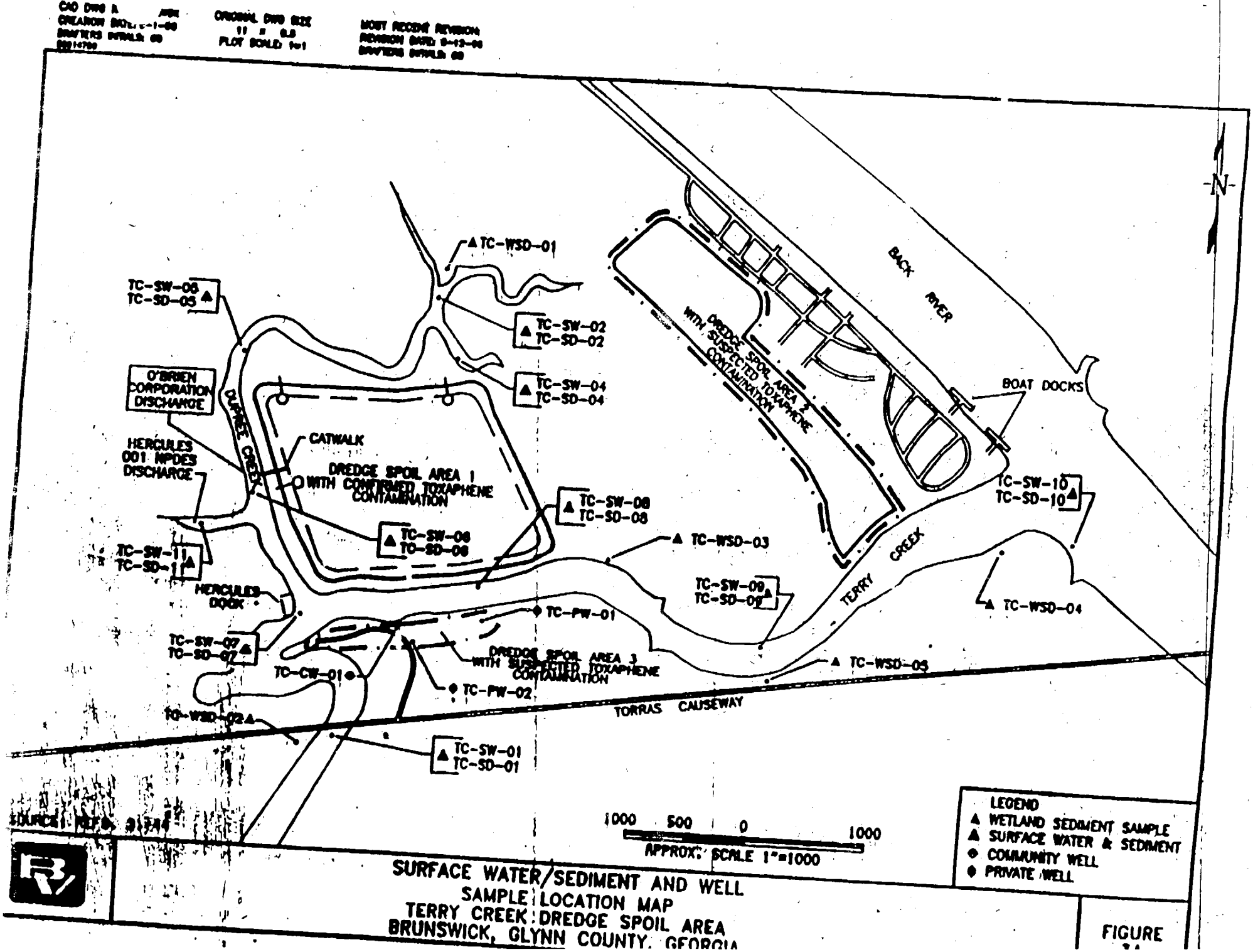
SITE LOCATION MAP
TERRY CREEK DREDGE SPOIL AREA
BRUNSWICK, GLENN COUNTY, GEORGIA

FIGURE 1



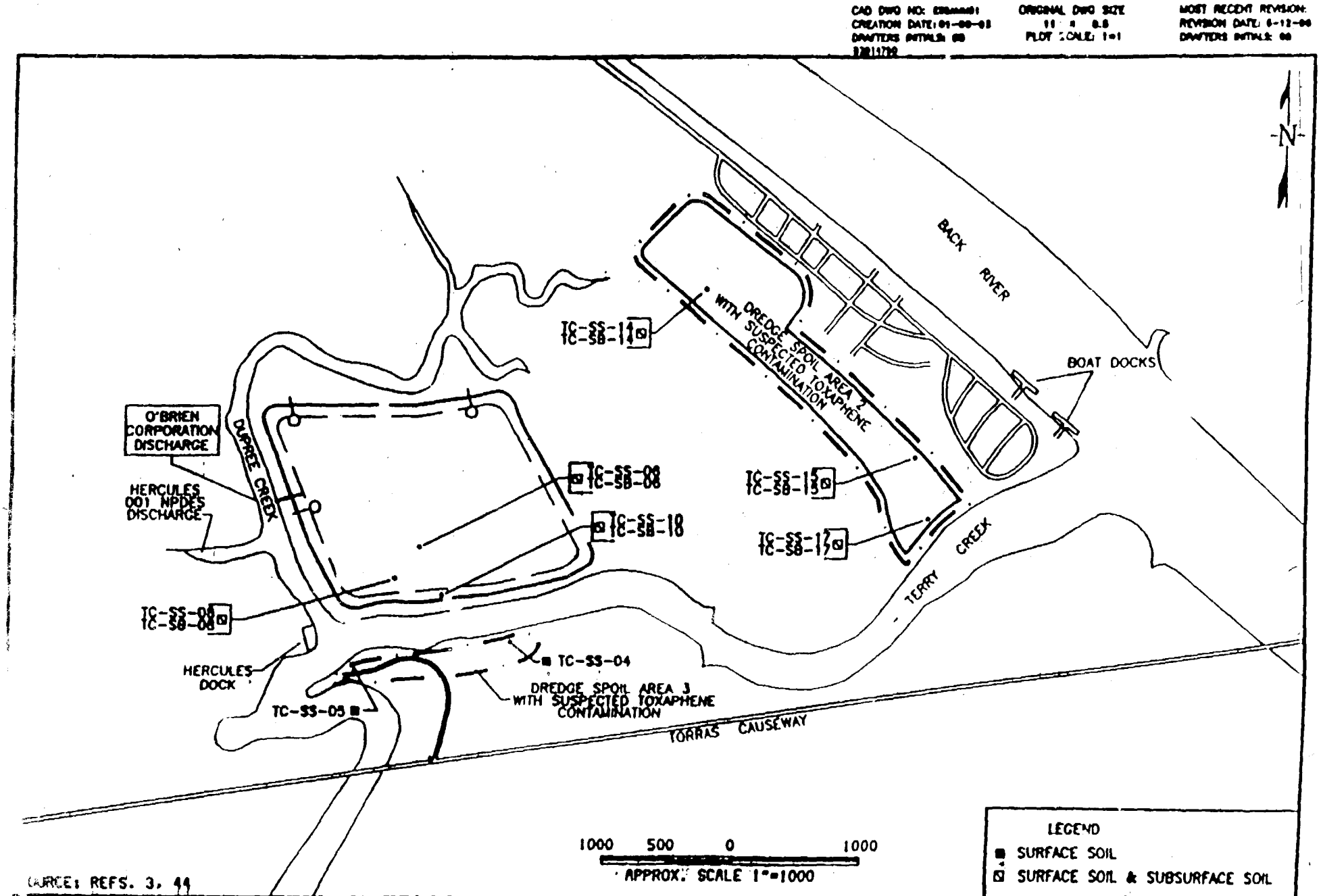
SITE LAYOUT MAP
TERRY CREEK DREDGE SPOIL AREA
BRUNSWICK, GLYNN COUNTY, GEORGIA

FIGURE
2



SURFACE WATER/SEDIMENT AND WELL SAMPLE LOCATION MAP
TERRY CREEK DREDGE SPOIL AREA
BRUNSWICK, GLYNN COUNTY, GEORGIA

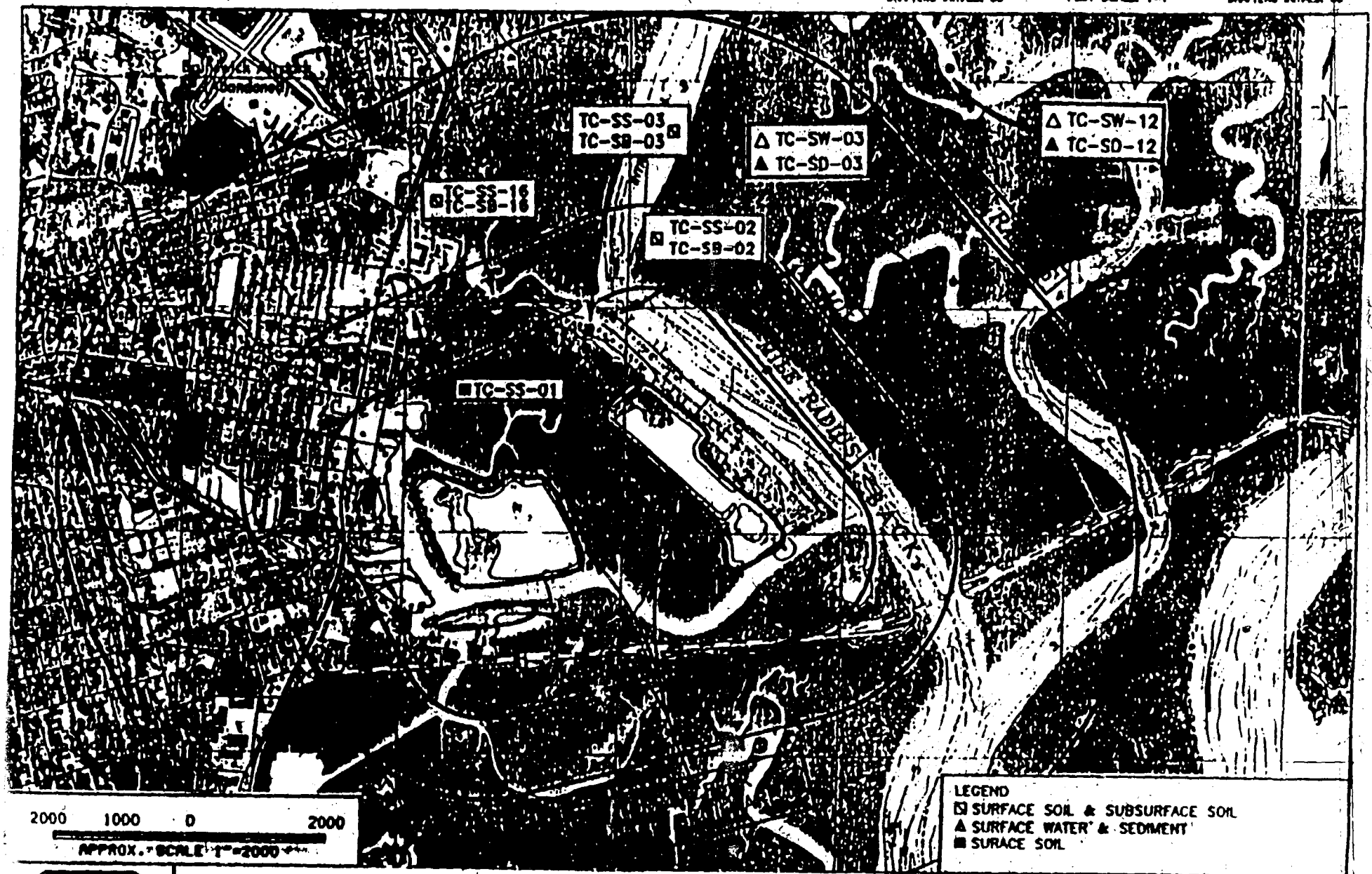
FIGURE



SOURCE: REFS. 3, 44

SURFACE SOIL AND SUBSURFACE SOIL
SAMPLE LOCATION MAP
TERRY CREEK DREDGE SPOIL AREA
BRUNSWICK, GLYNN COUNTY, GEORGIA

FIGURE
4



EXTENDED SURFACE WATER/SEDIMENT AND SURFACE/SUBSURFACE SOIL
SAMPLE LOCATION MAP
TERRY CREEK DREDGE SPOIL AREA
BRUNSWICK, GLYNN COUNTY, GEORGIA

FIGURE
3B

WORKSHEET FOR C ..UTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration pathway Score (Sgw) (from Table 3-1, line 13)	Not Scored	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100	10,000
2b.	Ground Water to Surface Water Migration component (from Table 4-25, line 28)	Not Scored	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	100	10,000
3.	Soil exposure Pathway Score (S_s) (from Table 5-1, line 22)	8.47	71.82
4.	Air Migration pathway Score (S_a) (from Table 6-1, line 12)	Not Scored	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$	10,071.82	
6.	HRS Site Score -- Divide the value on line 5 by 4 and take the square root	50.18	

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

Factor Categories and Factors		Maximum Value	Value Assigned	
DRINKING WATER THREAT				
Likelihood of Release				
1.	Observed Release	550	550	
2.	Potential Release by Overland Flow			
2a.	Containment	10	--	
2b.	Runoff	25	--	
2c.	Distance to Surface Water	25	--	
2d.	Potential to Release by Overland Flow [lines 2a x (2b + 2c)]	500	--	
3.	Potential to Release by Flood			
3a.	Containment (Flood)	10	--	
3b.	Flood Frequency	50	--	
3c.	Potential to Release by Flood (lines 3a x 3b)	500	--	
4.	Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	--	
5.	Likelihood of Release (higher of lines 1 and 4)	550		550
Waste Characteristics				
6.	Toxicity/Persistence	a	1,000	
7.	Hazardous Waste Quantity	a	10,000	
8.	Waste Characteristics	100		56
Targets				
9.	Nearest Intake	50	0	
10.	Population			
10a.	Level I Concentrations	b	0	
10b.	Level II Concentrations	b	0	
10c.	Potential Contamination	b	0	
10d.	Population (lines 10a + 10b + 10c)	b	0	
11.	Resources	5	5	
12.	Targets (lines 9 + 10d + 11)	b		5
Drinking Water Threat Score				
13.	Drinking Water Threat Score [(lines 5 x 8 x 12)/82,500, subject to a maximum of 100)	100		1.87

a Maximum value applies to waste characteristics category.
b Maximum value not applicable.
c Do not round to nearest integer.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
(continued)

Factor Categories and Factors		Maximum Value	Value Assigned	
HUMAN FOOD CHAIN THREAT				
Likelihood of Release				
14.	Likelihood of Release (same value as line 5)	550		550
	Waste Characteristics			
15.	Toxicity/Persistence/Bioaccumulation	a	5.0E+07	
16.	Hazardous Waste Quantity	a	10,000	
17.	Waste Characteristics	1,00		560
	Targets			
18.	Food Chain Individual	50	45	
19.	Population			
	19a. Level I Concentrations	b	0	
	19b. Level II Concentrations	b	0.09	
	19c. Potential Human Food Chain Contamination	b	6.0E-7	
	19d. Population (lines 19a + 19b + 19c)	b	0.09	
20.	Targets (lines 18 + 19d)			45.09
	Human Food Chain Threat Score			
21.	Human Food Chain Threat Score [(lines 14 x 17 x 20)/82,500, subject to a maximum of 100)	100		100
ENVIRONMENTAL THREAT				
	Likelihood of Release			
22.	Likelihood of Release (same value as line 5)	550		550

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
(continued)

Factor Categories and Factors		Maximum Value	Value Assigned	
ENVIRONMENTAL THREAT, (concluded)				
	Waste Characteristics			
23.	Ecosystem Toxicity/Persistence/Bioaccumulation	a	5.0E+08	
24.	Hazardous Waste Quantity	a	10	
25.	Waste Characteristics	1,00		10
26.	Sensitive Environments			
	26a. Level I Concentrations	b	0	
	26b. Level II Concentrations	b	325	
	26c. Potential Contamination	b	0	
	26d. Sensitive Environments (lines 26a + 26b + 26c)	b	325	
	Targets			
27.	Targets (value from line 26d)			325
	Environmental Threat Score			
28.	Environmental Threat Score [(lines 22 x 25 x 27)/82,500, subject to a maximum of 60]	60		60
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED				
29.	Watershed Score[c] (lines 13 + 21 + 28, subject to a maximum of 100)	100		100
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE				
30.	Component Score (S_{sf})[c] (highest score from line line 29 for all watersheds evaluated, subject to a maximum of 100)	100		100

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

SOIL EXPOSURE PATHWAY SCORESHEET

Factor Categories and Factors		Maximum Value	Value Assigned	
RESIDENT POPULATION THREAT				
Likelihood of Exposure				
1.	Likelihood of Exposure	550		550
Waste Characteristics				
2.	Toxicity	a	1,000	
3.	Hazardous Waste Quantity	a	10	
4.	Waste Characteristics	100		10
Targets				
5.	Resident Individual	50	50	
6.	Resident Population			
	6a. Level I Concentrations	b	77.1	
	6b. Level II Concentrations	b	0	
	6c. Resident Population (lines 6a + 6b)	b	77.1	
7.	Workers	15	0	
8.	Resources	5	0	
9.	Terrestrial Sensitive Environments	c	0	
10.	Targets (lines 5 + 6c + 7 + 8 + 9)	b		127.1
Resident Population Threat Score				
11.	Resident Population Threat (lines 1 x 4 x 10)	b		699050.00
NEARBY POPULATION THREAT				
Likelihood of Exposure				
12.	Attractiveness/Accessibility	100	75	
13.	Area of Contamination	100	5	
14.	Likelihood of Exposure	500		25
Waste Characteristics				
15.	Toxicity	a	1,000	
16.	Hazardous Waste Quantity	a	10	
17.	Waste Characteristics	100		10

SOIL EXPOSURE PATHWAY SCORESHEET
(continued)

Factor Categories and Factors		Maximum Value	Value Assigned	
NEARBY POPULATION THREAT, (continued)			See comments	
	Targets			
18.	Nearby Individual	1	0	
19.	Population Within 1 Mile	b	0.5	
20.	Targets (lines 18 +19)	b		0.5
	Nearby Population Threat Score			
21.	Nearby Population Threat (lines 14 x 17 x 20)			125
SOIL EXPOSURE PATHWAY SCORE				
22.	Soil Exposure Pathway Score[d] (S_s), (lines [11 + 21/] + 21/82500] subject to a maximum of 100)	100		8.47

References

1. U.S. Environmental Protection Agency, Hazard Ranking System, 40 CFR Part 300, Appendix A, 55 FR 51532, December 14, 1990.

2. U.S. Environmental Protection Agency, Superfund Chemical Data Matrix, September 1995. Appendix B-1; 76 pages.

3. U.S. Geological Survey, 7.5 minute series Topographic Quadrangle Maps of Georgia: Brunswick East 1979 (Photorevised [PR] 1988), Brunswick West 1979 (PR 1988), Dover Bluff 1979 (PR 1988), Jekyll Island 1979, scale 1:24,000; 1 map.

4. Black & Veatch Special Projects, Corp. Interim Final Listing Site Inspection Report, Hercules, Inc. Dredge Spoil Area, Brunswick, Glynn County, Georgia, Revision 0 Prepared for the Waste Management Division Environmental Protection Agency, Region 4, 66 pages. Appendix A, 385 pages.

5. Richard A. Hill, Chief, Economic & Social Analysis Branch, U.S. Army Corps of Engineers, Disposition Form and attachments to OP-PN (Garrett), February 29, 1988; 5 pages.

6. Charles W. Belin, Jr., Ph.D., Biologist, Environmental Resources Branch, U.S. Army Corps of Engineers, memorandum and attachments to Deputy District Engineer, Civil, U.S. Army Corps of Engineers, March 7, 1986. Subject: Dredging of Toxaphene-contaminated sediments at Terry Creek, Brunswick, GA; 14 pages.

7. Georgia Environmental Protection Division, Preliminary Assessment for Hercules, Inc. Dredge Spoil Area, GAD982112658, September 30, 1987; 2 pages.

8. Black & Veatch Special Projects Corp. Field Logbook Volume 1 for Hercules, Inc. Dredge Spoil Area ESI, Project # 52014.750. Documentation of Sampling Investigation, September 19-23, 1995, and February 28-29, 1996; 39 pages.

9. Black & Veatch Special Projects Corp. Field Logbook Volume 2 for Hercules, Inc. Dredge Spoil Area ESI, Project # 52014.750. Documentation of Sampling Investigation, September 19-23, 1995, and February 28-29, 1996; 31 pages.

10. Results of Specified Analysis; Toxaphene for Hercules, Inc. Dredge Spoil Area, EPA Region IV, Environmental Services Division, Athens, Georgia, October 26, 1995; 34 pages.

11. NUS Corporation, Superfund Division, Final Study Plan, Listing Site Inspection, Hercules, Inc. Dredge Spoil Area, Brunswick, Glynn County, Georgia, EPA ID # GAD982112658, Prepared Under TDD No. F4-8912-25, Contract No. 68-01-7346, Revision 0, for the Waste Management Division of the U.S. Environmental Protection Agency (March 26, 1991); 44 pages.

12. Toxaphene Pollution Abatement, prepared by Technical Staff - Hercules Incorporated, Brunswick, Georgia, November 6, 1970; 10 pages.

13. Arthur G. Linton, Federal Facilities Coordinator, U.S. Environmental Protection Agency, Region IV, memorandum to Beverly Spagg, Investigation and Support Section, Waste Management Division, U.S. Environmental Protection Agency, Region IV, February 28, 1989 Subject: Ownership of the dredge spoil areas. 1 page.

14. H.T. DeRigo, Biologist, Environmental Resources Section, U.S. Army Corps of Engineers, memorandum to District Engineers, June 16, 1971. Subject: Toxaphene releases in Terry Creek, Brunswick, Georgia; 1 page.

15. Jack B. Phillips, Jr., P.E., Chief, Soils Section, U.S. Army Corps of Engineers, memorandum to EN-BS (Wilson), February 27, 1986. Subject: Terry Creek Dikes; 1 page.

16. ATEC Associates, Inc., Best Management Practices Plan, Prepared for Hercules Incorporated, Brunswick, Georgia (May 7, 1993); 49 pages.

17. State of Georgia, Department of Natural Resources, Environmental Protection Division, Authorization to Discharge Under the National Pollutant Discharge Elimination System, Hercules, Inc., Brunswick, Glynn County, Georgia, for Dupree Creek, Permit No. GA 0003735, effective November 15, 1976 until September 30, 1981; 3 pages.

18. R.W. Turner Manager, Hercules Incorporated, Brunswick, Georgia, letter to Georgia Environmental Protection Division, Water Protection Branch, January 24, 1978. Subject: Notice of Noncompliance, NPDES Permit #GA0003735; 1 page.

19. Philip H. Howard, Handbook of Environmental Fate and Exposure Data for Organic Chemicals, Volume III, Pesticides, Excerpts, Lewis Publishers, Inc., Chelsea, Michigan, 1991. Pages 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640.

20. U.S. EPA Contract Laboratory Program, Statement of Work for Organics Analysis; Multi-Media, Multi-Concentration, Document Number OLM010, including Rev. 2/90 - 8/91; 15 pages. Also included: U.S. EPA Contract Laboratory Program, Statement of Work for Inorganics Analysis; Multi-Media, Multi Concentration, Document Number ILM02.0, 4 pages.

21. Glenn R. Hoffmann, Environmental Coordinator, Hercules Incorporated, letter to John R. Bozeman, Assistant chief, Marsh and Beach Section, Georgia Department of Natural Resources, January 6, 1987. Subject: Dupree Creek dredging and plant history. 1 page.

22. The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Excerpts, Eleventh Edition, Merck & Co., Rahway, N.J., 1989. Pages 1504, 1505.

23. Department of the Army, Office of the Savannah District Engineers, Real Estate, Brunswick Harbour, project Number C-423, Approved August 22, 1951. 2 maps.

24. Kristen V. Lombard, Black & Veatch Special Projects, Corp., telephone conversation with James Music, Georgia Department of Natural Resources (Coastal), March 8, 1996. Subject: Fishing information for Terry Creek, Back River, and St. Simons Sound. 1 page.

25. Georgia Marine Sciences Center, University System of Georgia, Skidaway Island, Georgia, Survey of Toxaphene Levels in Georgia Estuaries, Technical Report Series Number 72-2, (February 1972); 51 pages.

26. Philip R. Parsley, Chief, Technical Support Branch, Department of the Army, Savannah District, Corps of Engineers, letter and attachments to Kristen Lombard, Black and Veatch Waste Science March 27, 1996.

Subject: Information request regarding Hercule Inc. Dredge Spo Disposal; 86 pages.

27. State of Georgia, Department of Natural Resources, Environmental Protection Division, Authorization to Discharge Under the National Pollutant Discharge Elimination System, Hercules Incorporated, Brunswick, Georgia, for Dupree Creek, Permit No. GA0003735, effective from September 20, 1993, until August 31, 1998; 3 pages.

28. K.T. Horton, Assistant Manager, Hercules Incorporated, Brunswick, Georgia, letter and attachment to Georgia Environmental Protection Division, Water Quality Control Section, January 19, 1978. Subject: Notice of Noncompliance, NPDES Permit #GA0003735; 3 pages.

29. John C. White, Regional Administrator, United States Environmental Protection Agency, Region IV, letter and attachments to J. Leonard Ledbetter, Environmental Protection Division, Department of Natural Resources, May 4, 1978. Subject: Hercules Incorporated, Brunswick, Georgia, NPDES Permit No. GA0003735; 3 pages.

30. K.T. Horton, Resident Manager, Hercules Incorporated, Brunswick, Georgia, letter to Georgia Environmental Protection Division, Water Protection Branch, October 30, 1980. Subject: Notice of Noncompliance, NPDES Permit #GA0003735; 1 page.

31. K.T. Horton, Plant Manager, Hercules Incorporated, Brunswick, Georgia, letter and attachments to Georgia Environmental Protection Division, Water Quality Control Section, Industrial Waste Water Program, March 12, 1986. Subject: Operation Monitoring Report (Form WG 1.45) for February 1986; 3 pages.

32. Michael S. Creason, P.E., South Unit Coordinator, Industrial Wastewater Program, Georgia Department of Natural Resources, letter to Larry C. Deeg, Plant Manager, Hercules Incorporated, Brunswick, Georgia, April 17, 1991. Subject: Noncompliance of NPDES Permit No. GA 0003735; 1 page.

33. Larry Rogers Manager, Southeast Region, Georgia Department of Natural Resources, memorandum and attachments to Bob Bishop, Region Operations Program, Georgia Department of Natural Resources, September 14, 1987. Subject: Hercules, Inc. Wastewater Discharge of September 5, 1987; 7 pages.

34. H.E. Hicks, Manager, Hercules Incorporated, Brunswick, Georgia, letter to R.S. Howard, Jr., Executive Secretary, State Water Quality Control Board, December 21, 1970. Subject: Toxaphene Pollution Abatement; 1 page.

35. Final Report, Brunswick Estuary Modeling Project, submitted to USEPA in fulfillment of Statewide Plan Grant (P 004195-01-9) by the Environmental Protection Division, Georgia Department of Natural Resources, Atlanta, Georgia, (September 1984), Excerpts; 15 pages.

36. John A. McKeown, Georgia Project Officer, South Superfund Remedial Branch, Waste Management Division, United States Environmental Protection Agency, Region 4, memorandum to file, May 8, 1996. Subject: Surface Water Pathway Concerns for Herculec, Inc. Dredge Spoil Areas; 1 page.

37. Kristen Lombard, Black & Veatch Special Projects Corp., telephone conversation with Gary Bennett, Chief Chemist, U.S. EPA.

Environmental Services Division, May 16, 1996. Subject: Data Validation; 1 page.

38. Black & Veatch Waste Science, Inc., Field Study Plan, Expanded Site Inspection, Hercules, Inc. Dredge Spoil Area, Brunswick, Glynn County, Georgia, Prepared Under Contract 68-W9-0055 for the Waste Management Division of the U.S. Environmental Protection Agency, (September 5, 1995); 36 pages.

39. Black & Veatch Special Projects Corp., memorandum to file, May 21, 1996. Subject: Wetland Frontage Calculations; 2 pages.

40. Philip Laumeyer, Assistant Field Supervisor, United States Department of the Interior, Fish and Wildlife Service, Division of Ecological Services, letter to Colonel Stanley G. Genega, District Engineer, U.S. Army Corps of Engineers, February 2, 1987. Subject: Proposal to dredge Dupree Creek; 2 pages.

41. Kristen V. Lombard, Black & Veatch Special Projects Corp., telephone conversation with Mike Harris, Wildlife Biologist, Georgia Department of Natural Resources, March 8, 1996. Subject: Endangered and or threatened species along the surface water pathway; 1 page.

42. Maps of Brunswick and Glynn County, Georgia, Map Numbers 62, and 62 (Atlanta, Georgia: Schmidt Photogrammetrics, 1973); 2 maps

43. U.S. Department of Commerce, 1990 CPH-1-12: Summary Population and Housing Characteristics, Georgia, issued by Bureau of the Census, August, 1991; 3 pages.

44. Brunswick Golden Isles Chamber of Commerce, Map of Brunswick, St. Simons Island, Sea Island & Jekyll Island Including Glynn County, Bowden Custom Maps; 1 map.

45. U.S. Environmental Protection Agency, Graphical Exposure Modeling System (GEMS) Data Base, compiled from U.S. Bureau of the Census data (1983); 1 page.

46. Lesley S. Keck, Field Personnel, Black & Veatch Special Projects Corp., Addendum to Field Log book Volume 2, June 13, 1996. Subject: Sample collection methodology and sample collection locations; 1 page.

47. Central Hardware, Tide Table 1995, for Brunswick, St. Simons Island, Jekyll Island, Sea Island and adjacent areas; 4 pages.

48. U.S. Environmental Protection Agency, Site Analyses Hercules, Inc. Dredge Spoil Area, Environmental Monitoring Systems Laboratory, May 1991; 16 pages.

49. K.T. Horton, Resident Manager, Hercules Incorporated, Brunswick, Georgia, letter and attachments to Georgia Environmental Protection Division, Water Protection Branch, January 19, 1978. Subject: Notice of Noncompliance, NPDES Permit #GA0003735; 3 pages.

50. Georgia Department of Natural Resources, letter and attachments to Chief, Program Coordination Branch, Georgia Department of Natural Resources, January 17, 1978. Subject: Hercules, Inc Wastewater Discharge on January 17, 1978; 4 pages.

51. Otis C. Woods, Georgia Department of Natural Resources, memorandum to J. Harold Langford, Georgia Department of Natural Resources,

January 17, 1978. Subject: Hercules, Inc. Brunswick Lagoon Spill on January 17, 1978; 1 page

52. Dan Keck, Black & Veatch Waste Science, Inc., telephone conversation with Lavon Revells, U.S. Environmental Protection Agency, Environmental Services Division, July 27, 1995. Subject: Toxaphene Task Force, 1 page.

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

3. Comments by U.S. Army Corps of Engineers on H.R.S. Page 17-19: Source Description: Source 1 (Confined Disposal Area)

3.1 Identification of Site 1 as a Source:

Problem: This Confined Disposal Facility (CDF) should not have been identified as a "source" since it does not release contamination of any significant quantity to already contaminated creeks and marsh areas.

Discussion: The site scorers have erroneously interpreted study results to mean that Toxaphene contamination is being released from the CDF. This is incorrect as described below in Section 2.0 "Description of the Source" and Section 3.0 "Containment." Since the creek and marsh areas already contain Toxaphene contamination and have for decades, the mere presence of Toxaphene in areas adjacent to weir discharges does not indicate that a release has occurred from those weirs.

The CDF appears to be intact and retaining its contaminated sediments. Dike inspection on 23 Jun 1997 revealed that the dike is intact and functional. The interior of the CDF is heavily vegetated such that rainwater would be absorbed and root systems would prevent any significant movement of sediments toward the weirs. The weirs are no longer needed since this CDF is unlikely to be used in the next decade or more.

Conclusion: Source 1 should be deleted.

In the event that you disagree on the deletion of Source 1, we offer the following comments:

3.2 Erroneous Identification of Dredged Material Disposal Area as Surface Impoundment

Problem: Site scorers have erroneously identified this dredged material disposal area as "surface impoundments."

Discussion: EPA's regulations define a surface impoundment as

> "a facility or part of a facility that is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials designed to hold an accumulation of liquid wastes or wastes containing free liquids and which is not an injection well" (40 CFR 260.10).

Dredged material disposal areas are designed for deposition of sediment. Although liquid is introduced into disposal areas as a slurry (water and sediment), the areas are designed to hold the

liquid just long enough for settlement of suspended sediment. Once this settlement has occurred, the liquid (water) is released through the weirs. These sediments are not considered wastes, just sediments which have been relocated from the river bottom to an upland containment area.

We note that none of the other dredged material disposal areas were identified as surface impoundments.

Conclusion: Site should be re-identified as a volume of contaminated sediment.

3.3 Inaccurate Source Description

Problem: Several statements made by the site scorer are inaccurate. Other relevant information was omitted.

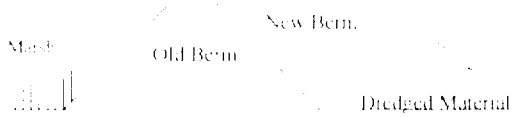
Discussion: The original dikes for the confined disposal facility (dredged material disposal area) were constructed by the City of Brunswick, not by the Corps of Engineers.

The engineered capacity of the CDF is not 16.7 acres. The reference for this statement was "Reference 6, Attachment 2." HRS Reference 6 is a 2-page Corps memorandum and an attachment that shows no acreage for the site. Regardless of what document the site scorers were referring to, the site is clearly larger than 16.7 acres. EPA and Hercules personnel have since estimated it at 72 acres. The original real estate easements assign an acreage of 94 acres. For correct information regarding volumes, we have provided detailed data on the volumes of the dredged material disposal areas with our comments on HRS Page 40.

No weirs discharge into Terry Creek, only Dupree Creek.

The site scorers state that the dike was constructed from borrow material that contained detectable levels of toxaphene. This is inaccurate; the original dikes were constructed before the contaminated material was ever placed in the CDF. Substantial amounts of dredged sediments from the 1930s and 1940s had been placed in unconfined areas of the marsh, including this site. The likely source of dike construction material was this previously dredged material. Since dredging was discontinued in 1946 and Toxaphene production did not begin until 1948, this material would not have been contaminated; the original dikes were not constructed using contaminated material. Later dike raisings (1978, 1982, and 1986) did use dredged material from the CDF interior, but were constructed to the inside of the original dikes which would significant decrease the likelihood of release of any such material. (see Diagram)

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)



The site scorers state that aerial photographs identified breeches and probably breeches in the dike. "Breech" is incorrect. Corps records do note weaknesses observed in the dike. An evaluation of dike stability is part of a pre-dredging planning and survey. CDFs only contain slurry material for a short time -- perhaps 4-8 weeks in the Terry Creek CDFs -- during and after the dredging event. Water is decanted off the site as quickly as possible so that the deposited sediments will dry, desiccate and consolidate. If in planning for dredging needs, a dike is observed to be incapable of withstanding the placement of tons of dredge slurry for its next dredging episode, the dike must be repaired or rebuilt before the CDF can be used. CDF dike "failures" typically are not catastrophic. While an isolated incident might result in the release of sediments from the site, they do not burst like dams and the damage is quickly repaired by dozer operation.

We believe that the aerial photograph reviewer may have mistaken a rise in the underlying marsh sediments for evidence of a dike breech -- as if large quantities of sediment had spilled from the impoundment. We observed this rise in our review of aerial photographs; the rise would be a result of the displacement of marsh sediments from the weight of the dike. This occurs when materials like wet marsh sediments are overlain by heavier dike material. The weight of the dike displaces the underlying sediments and causes upheavals of these displaced materials. These occurrences do not constitute a "breech" of the dike. The evidence we observed was located at the Northeast corner of the main disposal area where the displacement elevated the ground in the adjacent marsh area.

Additional site history is relevant as well. The record should show that the proposal to use the "Source 1" and "Source 4" CDFs were scrutinized by State and Federal agencies and approved by then Governor Jimmy Carter. Corps-provided documentation reveals that EPA actively participated in designing the study performed by Reimold and Durant and in establishing maximum toxaphene and turbidity thresholds that "will not harm man, fish and game or other beneficial aquatic life." EPA stated that the use of these areas "would be the least damaging to the environment of any sites available in the area." Documentation has been provided to EPA that shows that the 1973 dredging of Terry Creek "greatly enhanced the biological productivity of the estuary by isolating toxic materials in the diked enclosures."

Conclusion: "Description of the source" should be rewritten with attention to accuracy and complete information.

3.4 Containment

Problem: Several statements made by the site scorer are inaccurate.

Discussion: Site scorers state that "weirs are continually left open to provide drainage during heavy storms." This statement is misleading. A weir ponds water to allow sediments to settle out and then allows clean water to exit the site. Under normal conditions, a CDF weir restricts flow such that little or no sediment leaves the site. Good CDF management during and after dredging allows water to drain from the CDF as soon after dredging as possible. Weir boards are removed and/or replaced to adjust the level of ponded water during dredging, allowing clean water to discharge as quickly as possible. State water quality standards apply to such activities and must be met, including those for turbidity. There are no indications that those standards have ever been violated at this CDF.

Site scorers also erroneously assigned release data described in a Hercules document (HRS reference 12) to the CDF rather than from Source 2: Hercules outfall. If sediments from the CDF had been released into Dupree Creek, it is unlikely they would have ever reached levels which would cause contamination in the indigenous oysters in faraway St. Simons Sound; especially since the background levels in Dupree creek were probably equal to or higher than those inside the CDF.

Corps records show that periodic dike raisings sometimes also addressed erosion of a dike surface, but those reords provide no indication that any significant dike failure or loss of contaminated sediments into the already-contaminated surrounding waters or marshlands. Dikes are raised not to address "failures" but to provide for more dredged material disposal as it is needed in the future.

Therefore, the containment value for Source 1, if not deleted as discussed in Section 1.0 above, should be modified to: 9 (No evidence of hazardous substance migration from source area and the presence a functioning and maintained run-on control system and runoff management system.)

Conclusion: "Containment" paragraph should be rewritten.

3.5 Hazardous Waste Quantity

Problem: All data included by site scorers here are erroneous.

Discussion: There is no lagoon on Source 1 CDF. The area (16.7 acres) used is incorrect. The "surface impoundment" identification is incorrect as well. We have developed information on

volumes of sediments deposited on the various dredged material disposal areas. Refer to our comments on HRS page 40 for more specific information on correct volumes.

Conclusion: This entire section of the HRS, including the Source Hazardous Waste Quantity Value, should be revised per the information provided in our comments on Page 40.

See attached comments

SD-Characterization and Containment

SOURCE DESCRIPTION

The following sections describe areas which were identified as sources. These sources have released or have the potential to release contaminants to the sourrounding environments.

2.2 Source Characterization

Number of the source: 1

Name and description of the source: Surface Impoundment
The surface impoundment consists of contaminated sediments dredged from the bottom of Terry Creek and Dupree Creek, surface water bodies off the coast of Brunswick, Georgia (References. 5, pp. 2, 4; 6, Attachment 2; 12, pp. 4 - 7; 26, p. 1). This impoundment represents the largest disposal area used by the U.S. Army Corps of Engineers (USACE) during the Terry Creek Project (Reference 23). The impoundment was constructed by the USACE to contain dredge (Reference 6, Attachment 2). The engineered capacity of this impoundment is approximately 16.7 acres (Reference 6, Attachment 2). References indicate samples extracted from borrow material used to construct the impoundment dike contained detectable levels of toxaphene (Refs. 4, p. 48, 104; 15). The impoundment construction was such that sediment and water was deposited directly into the spoil area. As the solids settle out of the dredge slurry, water was allowed to drain out of three weirs and back into Terry and Dupree Creeks (Reference 6, Attachment 2, pp. 6, 7 , 8; 7, p. 1; 11, Fig. 2).

Location of the source, with reference to a map of the site:

The impoundment is located in a coastal marshlands bounded by Terry and Dupree Creeks (References. 3; 11, Figure 2; 8; 13), (See Figures 1, 3A of this documentation record).

Containment

Release via overland migration and/or flood:
The impoundment construction was such that sediment and water was deposited directly into the spoil area. As the solids settle out of the dredge slurry, water was allowed to drain out of three weirs and back into Terry and Dupree Creeks (Reference 6, Attachment 2, pp. 6, 7, 8; 7, p. 1; 11, Fig. 2). These weirs are continuously left open to provide drainage during heavy storms (Refs. 7, p. 1; 11, p. 6). File material indicates releases into Dupree Creek, where contaminants migrated to the marsh areas of Terry Creek and traveled as far as the indigenous oysters in St. Simons Sound (Reference 12, p. 4). Additionally, aerial photograph analysis findings include surface drainage from breeches and probable breeches in the dike wall (Reference 48, p. 2). Therefore a containment value of 10 was assigned (References 1, Table 4-2; 4, Appendix B, pp. 46, 47, 48, 49, 102, 103, 104; 48, p. 3).

Value: ~~10~~ 9

2.4.1. Hazardous Substances

Hazardous Substance	Evidence	Sample Type	Reference
Toxaphene	30,000C µg/kg	TC-SS-06	4, p. 46
Toxaphene	430,000C µg/kg	TC-SB-06	4, p. 102
Toxaphene	18,000C µg/kg	TC-SS-08	4, p. 47
Toxaphene	360,000C µg/kg	TC-SB-08	4, p. 103
Toxaphene	240,000C µg/kg	TC-SS-10	4, p. 48
Toxaphene	200,000C µg/kg	TC-SS-10 DUP	4, p. 49
Toxaphene	100,000C µg/kg	TC-SB-10	4, p. 104

µg/kg -- micrograms per kilogram
C -- Confirmed by GCMS
TC -- Terry Creek
SS -- Surface Soil Sample
SB -- Subsurface Soil Sample
DUP-- Duplicate.

Hazardous Substance	Evidence	Sample Type	Reference
Toxaphene*	36,000 µg/kg	SS-06	Reference 10, p. 9
Toxaphene	23,000 µg/kg	SS-08	Reference 10, p. 10
Toxaphene	110,000 µg/kg	SS-10	Reference 10, p. 11
Toxaphene	120,000 µg/kg	SS-10 DUP	Reference 10, p. 12

* -- The samples shown in this table reflect the toxaphene task force analysis results (Reference 52).
µg/kg -- micrograms per kilogram
SS -- Surface Soil Sample
DUP-- Duplicate.

2.4.2. Hazardous Waste Quantity

2.4.2.1.1. Hazardous Constituent Quantity

No information on constituent quantity for the lagoon was available.

2.4.2.1.2. Hazardous Wastestream Quantity

No information on hazardous wastestream quantity for the lagoon was available.

2.4.2.1.3. Volume

No information on the volume of sediments deposited in Source 1 was available.

2.4.2.1.4. Area

Revise

The engineered capacity of the impoundment was documented as approximately 16.7 Acres. Dimensions were based on U.S. COE Savannah District plan (Reference 6, Attachment 2, p. 3). (See the attached map on page 2 of this Documentation Record which identifies the source area).

Calculation
Area = 16.7 acres X (43,560 ft^2 per acre) = 727,452 ft^2

For area assigned value (Surface Impoundment): 727,452 ft^2 ÷ 13 = 55,957.85 (Reference 1, Section 2.4.2.1.3, Table 2-5).

2.4.2.1.5. Source Hazardous Waste Quantity Value

Revise

Source Hazardous Waste Quantity Value: ~~55,957.85~~
Reference(s): 1, Section 2.4.2.1.3, Table 2-5; 6, Attachment 2, p. 3

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

4. Comments by U.S. Army Corps of Engineers on H.R.S. Pages 20-22: Source Description: Source 2, Hercules Outfall

Problem: Site scorers have inadequately characterized Source 2.

Discussion: The description does not clearly describe that the Hercules Outfall is the ultimate source for virtually all Toxaphene sediment contamination at all "sources" in Terry Creek -- including the three dredge material disposal areas. It does not properly describe the commonly-known condition of the creek as a result of years of discharges from that outfall as being devoid of aquatic organisms.

Much of the information included on HRS page 36 could have been included here instead.

No attempt appears to have been made to determine what quantities of Toxaphene may have been released through the Outfall during the 1948-1972 period. No calculations have been made to determine what quantities may have been released under their NPDES permit (after 1976), even though monitoring records, which would include daily averages, are presumably available.

Conclusion: The description and hazardous waste quantity should be revised to better reflect Source 2's role in the overall contamination of the Terry Creek/Dupree Creek area and all sites identified by EPA as "sources" within that area.

SOURCE DESCRIPTION

2.2. Source Characterization

Number of the source: 2

Name and description of the source: Other

From 1948 through December of 1980 Hercules, Inc. produced toxaphene as its principal product (Reference 16, p. 1; 26, p. 1). During this period Hercules, Inc. formerly known as Hercules Powder Plant, discharged wastewater directly into Dupree Creek (References. 12, p. 4; 14; 26, p. 1). Areal interpretation of a November 12, 1971 photograph discovered a plume on Dupree Creek emanating from the Hercules outfall (Reference 48, pp. 6, 7). Allegedly, in 1966 Hercules Incorporated released wastewater discharge which contained approximately 250-300 pounds of toxaphene per day (Reference 14; 26, p. 1). However, with the completion of a new wastewater treatment system in 1972 toxaphene releases were reduced (Reference 14). In 1976, Hercules received their first National Pollution Discharge Elimination System (NPDES) permit, No. GA 0003735, for a outfall identified as 001 (Reference 17, p. 1). The permit restricted plant discharge of toxaphene to a daily maximum of one pound per day, and a daily average of 0.5 pounds per day (Reference 17, p. 3). During subsequent permit reissuance, toxaphene discharge was reduced to its present day limit of 0.00081 micrograms per liter based on a flow rate of eight million gallons per day (mgd) (Reference 27, p. 2). Several NPDES permit violations were documented during the time of operation (References 27; 28; 29; 30; 31; 32). On January 19, 1996, a Notice of non-compliance was issued to Hercules, Inc. for exceeding the release limit of 2 pounds of toxaphene per day. In this notice toxaphene 3.2 pounds of toxaphene was released on January 13, 1978, and 2.5 pounds of toxaphene was released on January 16, 1978 (Reference 28, p. 1). On January 24, 1978, Hercules, Inc. reported discharge of 6.8 pounds (Reference 18, p. 1). On October 23, 1980, Hercules, Inc. reported a total of 4.4 pounds of toxaphene discharged (Reference 30. p. 1). February 11, 1986, 2.74 pounds of toxaphene were released (Reference 31, p. 1). During the night of January 16, 1978, a breach occurred through the dike of a toxaphene settling basin, resulting on the loss of 400,000 to 500,000 gallons of settled water (Reference 49, p. 1). Hercules, Inc. reported the breach occurred at the location of the outfall pipe, flowed down a road and into the outfall (References 49, p. 1; 50, p. 1). Analysis performed on the toxaphene lagoon discharge detected 154 parts per billion (ppb) toxaphene (Reference 49, p. 3). Analysis of samples collected by EPD shows detectable levels of toxaphene at the outfall, and in the waters of Dupree and Terry Creeks immediately following the release (Reference 51).

SD-Hazardous Substances

Source №: 2
(Waste Water Discharge)

Location of the source, with reference to a map of the site:

The outfall is located at the east end of the culvert under U.S. 17 (Reference 17, p. 2) (See Figure 1 of this doc mentation record).

Containment

Release via overland migration and/or flood:

Surface water runoff enters onsite ditches which converge into outfall 001, and eventually discharges into Dupree Creek (References 17, p. 2; 33, p. 5). Due to its physical properties, toxaphene likely enters a water body through sediment losses (erosion) (References 16, p. 19; p. 632). Historically most post-production releases have occurred during periods of heavy rainfall (References 28, p. 1; 30; 31, p. 1; 32). As a result of properties and amount of toxaphene in the wastewater discharge, the Georgia Environmental Protection Division (EPD) issued a Consent Order which required Hercules implement a Best Management Practices Plan (BMPP) (Reference 16, Executive Summary; 18). The BMPP required Hercules to minimize erosion, thus preventing the introduction of toxaphene to storm water run-off (Reference 16, p. 25). Six NPDES violations were noted from July 1988 to July 1993 (Reference 18). On January 16, 1978 Hercules, Inc. experienced a loss of 400,000-500,000 gallons of water through a unsound dike in the settling pond (References 49, p. 1; 50, p. 1). Therefore a containment factor value of 10 was assigned (References 1, Table 4-2).

Value: 10

2.4.1. Hazardous Substances

Although toxaphene is documented in several references, no analytical data has been provided, therefore hazardous su tances were not evaluated (Refs 27; 28; 29; 30; 31; 32).

2.4.2. Hazardous Waste Quantity

2.4.2.1.1. Hazardous Constituent Quantity

No information on constituent quantity for the outfall was available.

2.4.2.1.2. Hazardous Wastestream Quantity

No information on hazardous wastestream quantity for the outfall was available.

2.4.2.1.3. Volume

No information on exact volume of this source is known.

2.4.2.1.4. Area

Area was not evaluated.

2.4.2.1.5. Source Hazardous Waste Quantity Value

Because some unknown quantity of waste was discharged, a hazardous waste quantity of >0 was applied (Reference 1, Section 2.4.2.2).

Source Hazardous Waste Quantity Value: >0
Reference(s): 1, Table 2-5

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

5. Comments by U.S. Army Corps of Engineers on H.R.S. Pages 23-25: Source Description: Source 3, Contaminated Soil (Unconfined Disposal Facility)

Inaccurate Characterization of Source 3

Problem: Site scorers have inaccurately characterized Source 3

Discussion: The site characterizations for Source 3 is in error -- partly because of a misinterpretation of Corps statements in our submittals to EPA. Site scorers stated that the "area was reportedly used as a spoil disposal easement [until] Governor Carter stopped dredge spoil activity in 1972." HRS reference 26 makes no statements about the site being used but rather that the site may have been used during the 1971 dredging episode which was terminated at the Governor's request. HRS reference 26 was submitted by the Corps in 1992 and at that time, we were unsure where the material had been placed. Further research shows that this site was not used during that period or any time after that period.

In 1971, the dredged material removed from Terry Creek (57,000 CY) was probably placed on dredge disposal easement known as "Tract 1" located west of this site. This has been verified by review of aerial photos from this era and by conversations with a Hercules employee living in the community at that time. No contaminated sediments were ever placed on this site.

We note for your reference that this site is 28.3 acres in size.

Any Toxaphene contamination found on the site could NOT have been a result of dredged material placement.

Conclusion: Source 3 should be deleted.

SOURCE DESCRIPTION

2.2. Source Characterization

Number of the source: 3

Name and description of the source: Contaminated Soil

As previously stated, USACE maintained several dredge disposal easements (References 23; 26, Operations Divisions File 1130, p. 1). A second dredge spoil easement is located south and across Terry Creek of the source 1 (Reference 23). The area was reportedly used as a spoil disposal easement from November 23, 1938 to 1972 when Governor Carter stopped dredge spoil activity in 1972 (Refs. 23; 26, Operations File, General, p. 5, Operations File 1130, p. 5). This area is currently utilized as a residential area (References 5, p. 3; 26, Operations File 1130, p. 16).

Location of the source, with reference to a map of the site:

The disposal area is located south of the impoundment bordered by Terry Creek to the north and Brunswick St. Simons Causeway to the south (References 3; 23), (See Figure 1 of this documentation record).

Containment

Release via overland migration and/or flood:

There is no documentation indicating runoff control by engineering standards (References 23; 26). Therefore a containment factor value of 10 was assigned (Reference 1, Table 4-2).

Value: ~~10~~ 5

2.4.1. Hazardous Substances

Hazardous Substance	Evidence	Sample Type	References
Toxaphene	2,200 µg/kg	TC-SS-04	4, p. 44; 8, p. 9
Toxaphene	9,300C µg/kg	TC-SS-05	4, p. 45; 8, p. 8

µg/kg -- micrograms per kilogram
C -- Confirmed by GCMS.
TC -- Terry Creek
SS -- Surface Soil Sample

Hazardous Substance	Evidence	Sample Type	References
Toxaphene*	680 µg/kg	SS-04	9, p. 9; 10, p. 7
Toxaphene	2,200 µg/kg	SS-05	9, p. 8; 10, p. 8

* -- Samples in this table reflect the results of the toxaphene task force screening results (Reference 52).

Background

Hazardous Substance	Evidence	Sample Type	Reference
Toxaphene	210U µg/kg	TC-SS-02	4, p. 42; 8, p. 6; 38, pp. 22, 26

µg/kg -- micrograms per kilogram
U -- Material analyzed for but not detected. The number is the minimum quantitation limit.
SS -- Surface Soil Sample

Hazardous Substance	Evidence	Sample Type	References
Toxaphene*	170U µg/kg	SS-02	10, p. 6

* -- Samples in this table reflect the results of the toxaphene task force screening results (Reference 52).

2.4.2. Hazardous Waste Quantity

2.4.2.1.1. Hazardous Constituent Quantity

No information on constituent quantity for the contaminated soil was available.

2.4.2.1.2. Hazardous Wastestream Quantity

No information on hazardous wastestream quantity for the contaminated soil was available.

2.4.2.1.3. Volume

No information on exact volume of this source is known.

2.4.2.1.4. Area

Two samples were confirmed as contaminated with toxaphene, therefore an exact area could not be measured. A hazardous waste quantity of >0 was applied (Reference 1, Section 2.4.2.2).

Reference(s): 1, Table 2-5
Area Assigned Value: >0

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source Hazardous Waste Quantity Value: >0
Reference(s): 1, Table 2-5

6. Comments by U.S. Army Corps of Engineers on H.R.S. Pages 26-28: Source Description: Source 4, Contaminated Soil (Confin Disposal Facility)

6.1 Identification of Site 4 as a Source:

Problem: This Confined Disposal Facility (CDF) should not have been identified as a "source" since it has not been shown to release contamination.

Discussion: The site scorers have no visual or lab results on which to base the assumption that Toxaphene contamination is leaving this site. The area has been diked to contain the dredged material. No samples have been taken anywhere outside of the CDF to show the presence of Toxaphene let alone that it has migrated from this site. The presence of Toxaphene inside the CDF does not indicate a release.

The CDF appears to be intact and retaining its contaminated sediments.

Conclusion: Source 4 should be deleted.

In the event that you disagree on the deletion of Source 4, we offer the following comments:

6.2 Source Description: Source 4, Contaminated Soil (Confined Disposal Facility)

Problem: Site scorers have inaccurately characterized Source 4.

Discussion: Additional site history is relevant as well. The record should show that the proposal to use the "Source 1" and "Source 4" CDFs were scrutinized by State and Federal agencies and approved by then Governor Jimmy Carter. Corps-provided documentation reveals that EPA actively participated in designing the study performed by Reimold and Durant and in establishing maximum toxaphene and turbidity thresholds that "will not harm man, fish and game or other beneficial aquatic life." EPA stated that the use of these areas "would be the least damaging to the environment of any sites available in the area." Documentation has been provided to EPA that shows that the 1973 dredging of Terry Creek "greatly enhanced the biological productivity of the estuary by isolating toxic materials in the diked enclosures."

The site characterization for Source 4 does not refer to its source of contamination: the creek.

The site scorers state that the site "was used as a perpetual spoil disposal ease[ment] for three years...." -- an obvious error. They have also apparently misquoted a 1982 Corps document to mean that the Source 4 site was in use at that time. The document the site scorers refer to is a Corps memo regarding a Utilization Report being prepared by the Corps real estate specialists:

> "Tracts #3 and #4 in Area B are the only active disposal areas for Terry Creek and these tracts are needed for future maintenance of the Terry Creek Project."

The report's land section notes:

> "Tract Nos. 4, Area B and 101E-3 are currently being used for dredged disposal and channel right-of-way purposes. Tract No. 2 is not being utilized, has several encroachments and is not needed for future use. Tract No. 1 is not presently being used but is required for future channel maintenance."

None of the tracts or areas referred to in this document describe the Source 4 CDF location. All of these tracts lie within Source 1, Source 3 and "Tract 1" dredge material disposal locations.

We note for your reference that this site is 69.0 acres in size.

Background levels used for comparison are inappropriate. They do not illustrate the contamination (if any) of the CDF's discharges in comparison to the existing contamination in the creek.

Conclusion: Source 4 should be deleted. At the least, "description of the source" should be rewritten with attention to accuracy and complete information.

6.3 Containment

Problem: Several statements made by the site scorers are inaccurate.

Discussion: Document states "There is no documentation indicating runoff control by engineering standards." This confined disposal facility (CDF) had an engineered dike to contain dredge slurry and control runoff, similar to Source 1. Since the 1972 dike construction occurred prior to the placement of any contaminated dredge material on this site, the dikes would not have been constructed with contaminated material. There have been no dike raisings for this site.

Therefore, the containment value for Source 4, if not deleted as discussed in Section 1.0 above, should be modified to: 9 (No evidence of hazardous substance migration from source area with a functioning and maintained run-on control system and runoff management system.)

Conclusion: "Containment" paragraph should be rewritten.

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

6.4 Hazardous Waste Quantity

Problem: Data included by site scorers is incomplete.

Discussion: In the course of preparing our comments for the HRS document, we have developed information on volumes of sediments deposited in the various CDFs. Refer to our comments on page 40 for more specific information on correct volumes.

Conclusion: This entire section of the HRS should be revised per the information provided in *our comments on Page 40. The Source Hazardous Waste Quantity Value should be: 100 (Susan Brinson is working on a final figure for desiccated dredge material)*

SOURCE DESCRIPTION

2.2. Source Characterization

Number of the source: 4

Name and description of the source: Contaminated Soil

As previously stated, USACE utilized several dredge spoil easements (Reference 23; 26, Operations Divisions File 1130, p. 1). A third dredge spoil area is located north of Terry Creek and west of the Back River (Reference 23). The area was reportedly used as a perpetual spoil disposal ease for three years or until the unit was filled, from January 1, 1973 (Reference 23). A 1982 memorandum reports the easement was used for dredge spoil disposal in 1982 (Reference 26, Operations Division File 1130, p. 16). The area that lies adjacent (northeast) is a housing development (Reference 3, 44).

Location of the source, with reference to a map of the site:

The disposal area is bordered by Terry Creek to the south and the Back River to the east (References 3; 23), (See Figure 1 of this documentation record).

Containment

Release via overland migration and/or flood:

There is no documentation indicating runoff control by engineering standards (Reference 26). There is evidence of contaminants in sediment samples which were also detected in this source. Contaminants were found in the sediment and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample (References 1, Table 4-2; 4, App. A, pp. 50, 51, 105, 106, 108).

Value: ~~10~~ 9

2.4.1. Hazardous Substances

Hazardous Substance	Evidence	Sample Type	Reference
Toxaphene	11,000C µg/kg	TC-SS-14	4, p. 50; 9, p. 1
Toxaphene	890 µg/kg	TC-SS-15	4, p. 51; 9, p. 2
Toxaphene	4500 µg/kg	TC-SB-14	4, p. 105; 9, p. 1
Toxaphene	5300 µg/kg	TC-SB-15	4, p. 106; 9, p. 2
Toxaphene	23,000C µg/kg	TC-SB-17	4, p. 108; 9, p. 2

µg/kg -- micrograms per kilogram
C -- Confirmed by GCMS.
TC -- Terry Creek
SS -- Surface Soil Sample
SB -- Subsurface Soil Sample

Background

Hazardous Substance	Evidence	Sample Type	Reference
Toxaphene	210U µg/kg	TC-SS-02	4, p. 42; 8, p. 6; 38, pp. 22, 26
Toxaphene	240U µg/kg	TC-SB-02	4, p. 100; 8, p. 6; 38, pp. 22, 26

µg/kg -- micrograms per kilogram
U -- Material analyzed for but not detected. The number is the minimum quantitation limit.
SS -- Surface Soil Sample
SB -- Subsurface Soil Sample

2.4.2. Hazardous Waste Quantity

2.4.2.1.1. Hazardous Constituent Quantity (See comments)

No information on constituent quantity for the contaminated soil was available.

2.4.2.1.2. Hazardous Wastestream Quantity

No information on hazardous wastestream quantity for the contaminated soil was available.

2.4.2.1.3. Volume

No information on exact volume of this source is known.

2.4.2.1.4. Area

Due to the results in the toxaphene task force screening data, an area of contaminated soil was not derived (References 10, pp. 13, 16, 17; 52). Therefore, the area of contaminated soil was not calculated.

Area of source (ft^2): >0
Reference(s): 1, Table 2-5
Area Assigned Value: >0

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source Hazardous Waste Quantity Value: >0
Reference(s): 1, Table 2-5

SITE SUMMARY OF SOURCE DESCRIPTIONS

Source Number	Source Hazardous Waste Quantity Value	Containment: Ground Water	Containment: Surface Water	Containment: Gas	Containment: Air Particulate
1	55,957.85	--	10	--	--
2	>0	--	10	--	--
3	>0	--	10	--	--
4	>0	--	10	--	--

Sum of values: 55,959.85

Revise per comments

Revise

Sum: ~~55,959.85~~

Hazardous Waste Quantity Factor Value: ~~10,000~~ 100

Reference(s): 1, Table 2-6

4.1. OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1.1. DEFINITION OF HAZARDOUS SUBSTANCE MIGRATION PATH FOR OVERLAND/FLOOD COMPONENT

Due to tidal influences, there are two hazardous substance migration pathways (Reference 47). The downstream migration carries runoff from surface impoundments, and the Hercules, Inc. NPDES discharge point into Dupree and Terry Creeks (Reference 3). From the most upstream probable point of entry (ppe_2), Dupree Creek flows south for approximately 0.4 mile, where it converges with Terry Creek (Reference 3). Terry Creek flows east for 1.3 miles, and merges with the Back River (Reference 3). The Back River flows south for approximately 1.8 miles where it empties into St. Simons Sound (Reference 3). The 15-mile downstream surface water pathway terminates in the Atlantic Ocean.

The upstream migration would carry runoff and discharge from ppe_2 approximately 47,000 feet north to the origin of Dupree Creek (Reference 3). The upstream migration pathway terminates at the origin of Dupree Creek (Reference 3).

7. Comments by U.S. Army Corps of Engineers on H.R.S. Pages 31-37: Likelihood of Release Value: Source of Toxaphene C mination

7.1 Attribution to Dredged Material Disposal Areas Not Accomplished

Problem: Site scorers prepared no attribution for Sources 1, 3 or 4

Discussion: Site scorers on page 35 "Direct Observation" describe two sources: the Hercules outfall and the dredged material disposal areas. However, the HRS document does not address attribution to dredge material disposal areas.

Attribution is required by 40 CFR 300, Appendix A, paragraph 2.3 which directs the site scorers to:

> "Establish an observed release either by direction observation of the release of a hazardous substance into the media being evaluated (for example, surface water) or by chemical analysis of samples appropriate to the pathway being evaluated. The minimum standard to establish an observed release by chemical analysis is analytical evidence of a hazardous substance in the media significantly above the background level. Further, some portion of the release must be attributable to the site."

Either the documentation is incomplete or the dredge material disposal sites should not have been included in the Direct Observation discussion.

If Hercules' Outfall alone provides sufficient evidence to constitute a "direct observation" of a release, then there is nothing more to be said about this portion of the scoring. If, however, the scoring is fully or partially based on supposed direct observation of a release from the dredged material disposal areas, insufficient evidence has been presented.

7.2 Direct Observation Determination Unsupported for Dredged Material Disposal Areas

Problem: Site scorers have not demonstrated sufficient information or data to verify the "Direct Observation" scoring determination for Sources 1, 3, or 4.

Discussion: The presence of toxaphene on the dredge material disposal areas is a result of the various 1971-1989 dredging episodes of Terry and Dupree Creeks. The source of toxaphene contamination for the dredge disposal material was Terry and Dupree Creeks. The creeks were contaminated prior to dredging and continued to be contaminated after dredging was performed; dredging was not performed as an environmental removal action, but rather to maintain a navigable waterway.

It is important to understand that when these creeks are dredged, not all the sediments from bank to bank are removed. Only the Congressionally-authorized navigation channel width, depth and length is dredged -- to a tolerance of 2 feet over-swing and over-depth. We have enclosed a copy of a map of the navigation channel for your perusal. (Enclosure 2) Terry and Dupree Creeks were not dredged in their entirety; banks, wetland marsh areas, inlets, and the upstream portions of Terry and Dupree Creeks were not dredged. Therefore significant amounts of contaminated sediments would clearly have remained in the creeks after dredging and would account for the toxaphene presence noted in the various studies and samples from this site. Therefore, it is erroneous to make the assumption that the contamination found in the creek and marsh sediments is a result of discharges from the weirs.

Hercules, Incorporated began manufacturing Toxaphene in 1948. One Corps record (HRS reference 14) documents a Georgia state official's statement that Hercules discharged 250-300 pounds of Toxaphene a day in 1966 and was not able to reduce this discharge to 1 pound per day until 1972. Between 1948 and 1971, a substantial quantity of Toxaphene must have been discharged into Dupree and Terry Creeks. If a very low estimate is used to calculate the probable discharge -- an average of 10 pounds a day -- it would show:

10 lbs/day x 5 days/week x 52 weeks/year x 24 years = 62,400 lbs of Toxaphene
(discharged into Dupree Creek and dispersing into Terry Creek and perhaps downstream)

If a high estimate is used to calculate -- an average of 250 or 300 pounds a day -- it would show:

250 lbs/day x 5 days/week x 52 weeks/year x 24 years = 1.56 million lbs of Toxaphene
300 lbs/day x 5 days/week x 52 weeks/year x 24 years = 1.87 million lbs of Toxaphene
(discharged into Dupree Creek and dispersing into Terry Creek and perhaps downstream)

When considering the probable quantity of Toxaphene, it is clear why the creek was sometimes described as "dead." In 1971, Hercules celebrated their successful water treatment in an article that noted *"Life is back in Terry Creek...."* which notes that for the first time in years, game fish had been found alive in Terry Creek. (Enclosure 1) It is reasonable to assume that huge amounts of Toxaphene were discharged into the creeks prior to the 1971 and 1973 dredging episodes. Therefore, toxaphene was present during all dredging events in the 1970s and 1980s and likely remains present in the creek sediments today.

To determine what level of contamination (if any) is exiting the dredged material disposal areas, site investigators would have had to sample weir effluent. Sampling of the sediments outside of the weir discharge pipes provides inadequate evidence; these sediments were already contaminated prior to the creation of the dredged material disposal area. Actual weir effluent was not assessed by the site investigators. Nor were background levels of contamination in the creeks relative to the weir discharges appropriately assessed.

The background locations selected for the site were appropriate for the evaluation of the Hercules Outfall, but inappropriate for evaluation of the dredged material disposal areas. Two samples were taken were from outside the influence of the Hercules Outfall; the other two samples were taken at a site or depth that would show atypically low contamination, including one in 7-8 foot deep marsh sediment. However, a non-background sample (TC-WSD-01) taken less than 300 feet from the marsh sediment sample revealed 46,000 ug/kg of Toxaphene, a more likely background level for this area of Dupree Creek.

Of the few samples taken within the dredged material disposal area, the high contamination levels found were primarily at depths of four feet -- an unlikely source of rainwater runoff contamination. Surface samples taken in these locations within the bermed area had 30,000 and 18,000 ug/kg toxaphene -- less than the 46,000 ug/kg level found in the nearby marsh area.

Corps geologists who specialize in assessing contamination have reviewed this assessment problem. They determined that the only way to accurately assess the likelihood of release from the dredged material disposal area weirs would be to take stormwater samples at the weir discharge during a significant rainfall. Any other method would assess both effluent discharge from the weir and pre-existing contaminated sediments/soils.

Conclusion: Without specific weir effluent sampling, the site evaluators cannot claim to have observed a release from the dredged material disposal areas. Background levels from the already contaminated creek discount the presence of contamination as evidence of release from the dredged material disposal areas. Many of the scoresheet lines in the HRS document are determined based on this "Direct Observation" finding; therefore this foundational error could discredit many lines of the HRS score.

Scoresheet line numbers within the Surface Water Overland/Flood Migration Component that are dependent on this "Observed Release" determination are: 1,5, 14, 18, 20, 21, 22, 26b, 26d, 27, 28, 29, 30.

4.1.2.1. LIKELIHOOD OF RELEASE

see comments

4.1.2.1.1. Observed Release

Chemical Analysis

- Background Concentration

Sample ID	Sampling Location	Depth*	Date	Reference(s)
TC-SD-02	Upgradient of Hercules on Dupree Creek.	7 to 8 feet	9/20/95	9, pp. 5, 7
TC-SD-03	Approximately 0.75 mile east-northeast of site on first major left tributary of Little River upgradient of confluence with Back River.	Not Documented	9/20/95	9, p. 8
TC-SD-12	Approximately 1.25 miles north-northeast of site (upgradient on Little River).	Not Documented	9/20/95	9, p. 6
TC-WSD-05	Approximately 1.4 miles southeast of the site (downgradient in the wetland adjacent to Terry Creek).	Not Documented	9/22/95	9, p. 15

TC -- Terry Creek
SD -- Sediment Sample
WSD -- Wetland sediment sample
* -- Indicates under water depth to the top of sediment. All sediment samples were collected using stainless steel hand augers with extensions. Samples were collected within 10 feet of the river bank during high tide recession (References 46; 47).

Sample ID	Hazardous Substance	Concentration	Sample Quantitation Limit**	Reference(s)
TC-SD-02	Toxaphene	--	260 µg/kg	4, p. 267
TC-SD-03	Toxaphene	--	570 µg/kg	4, p. 268
TC-SD-12	Toxaphene	--	340 µg/kg	4, p. 278
TC-WSD-05	Toxaphene	160J[1] µg/kg	170 µg/kg	4, p. 283; 20, p. C-8

µg/kg -- micrograms per kilograms
** -- CRQL's are listed when a figure is given in the concentration column. Otherwise the SQL is listed.
1 -- The J flag indicates that sample results are below quantitation limits.
-- Indicates contaminant was not detected in the sample.

- Background Concentration continued

Sample ID*	Hazardous Substance	Concentration	Sample Quantitation Limit	Reference(s)
SD-02	Toxaphene	--	2500 µg/kg	10, p. 19
SD-03	Toxaphene	--	760 µg/kg	10, p. 20
SD-12	Toxaphene	--	450 µg/kg	10, p. 29
WSD-05	Toxaphene	--	1300 µg/kg	10, p. 34

* -- The samples shown in this table reflect the toxaphene task force analyses results (Reference 52).
µg/kg -- micrograms per kilograms
TC -- Terry Creek
SD -- Sediment Sample
WSD -- Wetland sediment sample
-- Indicates contaminant was not detected in the sample.

- Contaminated Samples

Sample ID	Sampling Location	Depth*	Date	Reference(s)
TC-SD-01	South of Torras Causeway on Terry Creek.	approx. 4 feet	9/21/95	9, p. 11
TC-SD-04	Northeast of Dredge Spoil Area 1, on Dupree Creek.	5 feet	9/21/95	9, p. 10
TC-SD-05	Northwest of Dredge Spoil Area 1, on Dupree Creek.	Not Documented	9/20/95	9, p. 6
TC-SD-06	West of Dredge Spoil Area 1.	Not Documented	9/22/95	9, p. 15
TC-SD-07	Southwest of Dredge Spoil Area 1, and adjacent to Hercules dock.	approx. 5.5 feet	9/22/95	9, p. 17
TC-SD-08	South of Dredge Spoil Area 1, in Terry Creek.	3 feet	9/22/95	9, pp. 16, 17
TC-SD-80	Duplicate of TC-SD-08	3 feet	9/22/95	9, pp. 16, 17
TC-SD-09	East-southeast of Dredge Spoil Area 1, in Terry Creek.	approx. 3 feet	9/22/95	9, p. 16
TC-SD-10	In Back River, just downstream of confluence with Terry Creek.	approx. 4 feet	9/21/95	9, pp. 12, 14
TC-SD-11	Dupree Creek at Hercules NPDES discharge 001.	approx. 5 feet	9/22/95	9, pp. 14, 15
TC-WSD-01	On Dupree Creek approximately 0.56 mile from Dredge Spoil Area 1.	0-1 feet bls	9/20/95	9, pp. 5, 7

* -- Indicates under water depth to the top of sediment. All sediment samples were collected within 10 feet of the river bank during high tide recession (References 46; 47).
TC -- Terry Creek
SD -- Sediment Sample
WSD -- Wetland sediment sample

- Contaminated Samples, continued

Sample ID	Hazardous Substance	Concentration	CRQL	Reference(s)
TC-SD-01	Toxaphene	62,000 µg/kg	170 µg/kg	4, p. 266; 20, p. C-8
TC-SD-04	Toxaphene	3,100 µg/kg	170 µg/kg	4, p. 269; 20, p. C-8
TC-SD-05	Toxaphene	30,000C µg/kg	170 µg/kg	4, p. 270; 20, p. C-8
TC-SD-06	Toxaphene	1,500 µg/kg	170 µg/kg	4, p. 271; 20, p. C-8
TC-SD-07	Toxaphene	610 µg/kg	170 µg/kg	4, p. 272; 20, p. C-8
TC-SD-08	Toxaphene	2,100 µg/kg	170 µg/kg	4, p. 273; 20, p. C-8
TC-SD-80	Toxaphene	2,400 µg/kg	170 µg/kg	4, p. 274; 20, p. C-8
TC-SD-09	Toxaphene	310J µg/kg	170 µg/kg	4, p. 275; 20, p. C-8
TC-SD-10	Toxaphene	1,100 µg/kg	170 µg/kg	4, p. 276; 20, p. C-8
TC-SD-11	Toxaphene	34,000 µg/kg	170 µg/kg	4, p. 277; 20, p. C-8
TC-WSD-01	Toxaphene	46,000C µg/kg	170 µg/kg	4, p. 279; 20, p. C-8

C -- Confirmed by GCMS, sample is considered valid by U.S. EPA Environmental Services Division (Reference 37).
µg/kg -- micrograms per kilograms
TC -- Terry Creek
SD -- Sediment Sample
WSD -- Wetland sediment sample

- Contaminated Samples, continued

Sample ID	Hazardous Substance	Concentration	CRQL	Reference(s)
SD-01*	Toxaphene	17,000 µg/kg	1) µg/kg	10, p. 18; 20, p. C-8
SD-05	Toxaphene	8,500 µg/kg	170 µg/kg	10, p. 22; 20, p. C-8
SD-08	Toxaphene	29,000 µg/kg	170 µg/kg	10, p. 25; 20, p. C-8
SD-80	Toxaphene	6,600J µg/kg	170 µg/kg	10, p. 26; 20, p. C-8
SD-11	Toxaphene	15,000 µg/kg	170 µg/kg	10, p. 28; 20, p. C-8
WSD-01	Toxaphene	31,000 µg/kg	170 µg/kg	10, p. 30; 20, p. C-8

* -- The samples shown in this table reflect the toxaphene task force analyses results (References 38, App. A; 52).
µg/kg -- micrograms per kilograms
TC -- Terry Creek
SD -- Sediment Sample
WSD -- Wetland sediment sample

Direct Observation

During the time of production, file material indicates Hercules Incorporated released approximately 250-300 pounds of toxaphene per day directly into Dupree Creek (References 12, p. 4; 14). Six NPDES violations occurred from July 1988 to July 1993 (Reference 18). It is unknown if any violations occurred prior to 1988 since the Georgia EPD did not maintain a computer data base prior to that time.

The impoundment was designed to allow dredge to settle and supernatant would drain through three weirs into Terry and Dupree Creeks (Reference 6, Attachment 2, pp. 6, 7, 8; 7, p. 1; 11, Fig. 2). These weirs are continuously left open to provide drainage during heavy storms (References 7, p. 1; 11, p. 6). Several samples have been collected from dredged material and material which was used to compose the spoil (References 4; 6, p. 1; 15). Results from these investigations revealed contamination in both the dredged material and the dikes used to build the impoundment (References 4; 6, p. 1; 15).

Attribution:
Hercules Incorporated produced toxaphene from 1948 through December 1980 (References 16, p. 1; 21). Toxaphene was patented to Hercules in 1951 (Reference 22, p. 1504). Toxaphene is manufactured by reacting chlorine gas with camphene (Reference 34, p. 1). Camphene is a derivative of turpentine which Hercules extracted from pine stumps (Reference 34, p. 1). For control, the reaction is carried out in a solution of carbon tetrachloride, which is subsequently evaporated from the product and recycled. Hydrogen chloride (HCl) is also a by-product of the reaction and is vented from the reactor along with unreacted chlorine gas (Reference 34, p. 1). The HCl gas is absorbed in water to form hydrochloric acid, part of which is sold as commercial acid, and the remainder neutralized by limerock (Reference 34, p. 1). Unreacted chlorine is neutralized through a process using lime, scrubbers, and caustic soda (Reference 34, p. 1). In a Hercules Incorporated letter dated December, 21, 1970, Hercules states "the process was designed to avoid polluting the atmosphere with noxious gasses, but has created a liquid waste discharge" (Reference 34, p. 1).

Since Toxaphene is not a single compound, but a mixture of at least 175 individual compounds, mechanisms affecting movement and degradation are extremely complex (References 16, p. 18; 19, p. 631). Due to a high sorption coefficient, toxaphene is sorbed to soil and will not be expected to be removed significantly by run-off unless adsorbed to clay particles (Reference 19, p. 631). When released to soil toxaphene will persist for a period of 1-14 years (Reference 19, p. 631). Toxaphene released to water will not significantly hydrolyze, photolyze, or significantly biodegrade (Reference 19, p. 631). The toxaphene will sorb to sediments and bioconcentrate in aquatic organisms (Reference 19, p. 631).

Although Hercules, Inc. ceased production of toxaphene in 1980, due to its persistence proven by onsite sample and documented NPDES permit violation releases, toxaphene still remains on the Hercules, Inc. property (Reference 16, p. 1; 28; 29; 30; 31). In accordance with a Consent Order issued by EPD to control toxaphene discharges, Hercules Inc. contracted ATEC Associates, Inc. in 1993 to complete a Best Management Practices Plan (Reference 16, Executive Summary). As part of this plan, analysis of surface soil and onsite sediments were performed (Reference 16, Executive Summary). As a result of these analyses, ATEC Associates, Inc. recommended several practices to address the toxaphene effluent contamination (Reference 16, Executive Summary). Hercules Incorporated reportedly released 200-300 pounds of toxaphene per day to Dupree Creek until the completion of the water treatment system in 1972 (Reference 14). There are numerous toxaphene NPDES permit violations, usually reported during periods of heavy rain (References 28; 29; 30; 31). Elevated concentrations of toxaphene were found in the sediments of Terry Creek and surface impoundments associated with dredge disposal (Reference 4, pp. 50, 51, 105, 106, 108, 266, 269, 270, 271, 272, 273, 274, 275, 276, 277, 279). Hercules, Inc. is the only company known to produce toxaphene.

on the eastern seaboard of Georgia (Reference 36). Hercules, Inc. has another site in the area, the Hercules 009 Landfill (Reference 36). This site is currently listed on the NPL list and undergoing remedial action (Reference 36). The Hercules 009 landfill site is located approximately 2.5 miles northwest of the Terry Creek sources (Reference 36). The Hercules 009 Landfill overland drainage pathway is northeast to Belle Point Creek (Reference 36). Belle Point Creek does not flow into Terry or Dupree Creeks (References 3; 36).

Hazardous Substances Released:

Toxaphene

Error - See Comments.

Observed Release Factor Value: ~~550~~

4.1.2.1.2. POTENTIAL TO RELEASE

The criteria has been met to constitute an observed release to surface water. Therefore, the potential to release component of this pathway was not evaluated.

==========

Potential To Release Factor Value: N/A

4.1.2.2. WASTE CHARACTERISTICS

4.1.2.2.1. Toxicity/Persistence

Hazardous Substance	Source #	Toxicity Factor Value	Toxicity/ Persistence Factor Value (Table 4-12)	Persistence Factor Value	References
Toxaphene	1, 2, 3, 4	1,000	1,000	1.0	1; 2, p. B-18

Toxicity/Persistence Factor Value: 1,000

8. Comments by U.S. Army Corps of Engineers on H.R.S. Page 40: Hazardous Waste Quantity (for Drinking Water): Incorrect Quantification

8.1 Hazardous Waste Quantity Score: Erroneous Values Used in Calculation

Problem: Site scorers have erroneously identified the Source 1 dredged material disposal area as a "Surface Impoundment." This, in combination with a second factor (discussed in section 2.0 below) has erroneously elevated the Hazardous Waste Quantity Factor Value.

Discussion: As discussed in Section 2.1.0 of U.S. Army Corps of Engineers Comments on H.R.S. Page 17-19, dredged material disposal areas are designed to contain sediment, not liquid. They are designed to decant water as efficiently as possible -- not hold it -- and to contain the sediment so that it is not reintroduced into the waterway to be dredged again in the future. Also, these sediments are not considered wastes, just sediments.

Conclusion: Site should be re-identified as a volume of contaminated sediment.

8.2 Incorrect Area Calculation of Source 1 Dredged Material Disposal Area

Problem: As discussed in section 2.1.2 of our comments on HRS pages 17-19, scorers used incorrect data on the size (acreage) of the "Source 1" CDF. They listed its size as only 16.7 acres when the property is substantially larger. (94 acres)

Discussion: In reviewing the HRS document and seeking a more accurate way to reflect the actual quantities (and risks) of the CDF's, we attempted to estimate what the maximum dredging volume of sediment could have been. In showing our rough estimates to Corps staff with institutional memory of dredging activities, we were able to locate previously forgotten records that revealed some helpful additional information to more accurately calculate the volumes placed on the CDFs. Since some of our numbers are based on reasonable deductions from various scraps of information, we have documented our reasoning in Enclosure 3. Dredged material is generally measured in cubic yards (CY). Some documents showed us credited yardage, while others revealed inaccurate estimates of quantities but reasonable proportions for division of the total quantity dredged between the two different CDF destinations that were used.

We estimate the following quantities were placed on the following CDFs during the various dredging actions:

Year	Source 1, CY	Source 3	Source 4, CY	Tract 1, CY
FY71	0	0	0	50,000
FY73	170,000	0	205,000	0
FY78	160,000	0	165,000	0
FY82	270,000	0	0	0
FY87	280,000	0	0	0
FY88	30,000	0	0	0
TOTALS	910,000	0	370,000	50,000
GRAND TOTAL ALL COLUMNS: 1,330,000 CY				

* Tract 1 is located south of the mouth of Terry Creek, west of the Back River and east of "Source 3."

Using the corrected volumetric figures, and the corrected identification of the site as contaminated soil rather than a surface impoundment, the calculation for Source 1 would be:

Equation or Process	Calculation
VOLUME (yd^3) / 2500 = _____ (Reference: Table 2-5)	910,000 CY / 2500 = 364
Using _____, assigned value per Table 2-6 = _____	Score of 364 ⇨ 100

The new score for line 16 would be 100 instead of the previous score of 10,000.

Using the same calculation process for Source 4, their individual site score would be:

Calculation
370,000 CY / 2500 = 148
Score of 148 ⇨ 100

Source 3, of course, would score 0.

This revises line 17 of the Surface Water Overland/Flood Migration Component Scoresheet to a value of 180 per table 2-7, down from the original score of 560, and line 21 to a value of 49.19 rather than 100. This revises the Waste Characteristics Factor Category Value to 18, down from 56.

Scoresheet line numbers within the Surface Water Overland/Flood Migration Component that are dependent on this "Hazardous Waste Quantity Factor Value" are: 7, 8, 13, 24, 27, 28, 29, 30.

4.1.2.2.2. Hazardous Waste Quantity

Source Number	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5.)	Is source hazardous constituent quantity data complete? (yes/no)
1	55,957.85	No
2	>0	No
3	>0	No
4	>0	No

Sum of values: 55,957.85

4.1.2.2.3. Waste Characteristics Factor Category Value

Toxicity/Persistence Factor Value: 1,000
Hazardous Waste Quantity Factor Value (Reference 1, Table 2-6): ~~10,000~~ 100

Toxicity/Persistence Factor Value
x Hazardous Waste Quantity Factor Value: 1.0E + ~~07~~ 05

Applied to Reference 1, Table 2-7 yields a Waste Characteristics Factor Category Value of: ~~56~~ 18

Hazardous Waste Quantity Factor Value: ~~10,000~~ 100
Waste Characteristics Factor Category Value: ~~56~~ 18
Reference(s): 1, Table 2-6, Table 2-7

4.1.2.3. DRINKING WATER THREAT-TARGETS

Because the entire pathway is brackish, there are no known drinking water intakes located along the surface water pathway (Reference 24).

Drinking Water Threat Pathway Targets: 0

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

1. Comments by U.S. Army Corps of Engineers on H.R.S. Pa 12: Resource Fac Value: Erroneous Interpretation of Terminology

Problem: Site scorers have erroneously scored the surface water pathway as a "major or designated water recreation area, excluding drinking water use."

Discussion: Although recreational fishing occurs in Terry and Dupree Creeks, it is not a "major or designated water recreation area." These waters are classified by the Georgia Department of Natural Resources as "Fishing" waters. The Georgia state regulation (Chapter 391-3-6) concerning designations for all streams and reaches of the State include the following use classifications:

Drinking Water Supplies
Recreation
Wild River
Scenic River
Coastal Fishing
Fishing

The "Fishing" categroy is the poweest use classification used by the state. If Terry Creek qualified as a "major designated water recreation area," it would have been classified as "recreation" or another higher classification other than "Fishing."

We have included a copy of the Georgia regulations that refer to this classification system and which list all the designated areas -- altogether omitting mention of Terry and Dupree Creeks. (Enclosure 4.) This was verified by a conversation with Georgia Department of Natural Resources' Nick Nicholson on 18 Jul 1997. (Documented in Enclosure 5.)

Conciusion: The Resources Factor Value should be 0.

4.1.2.3.3. Resources

The entire 15-mile surface water pathway is used as a recreational fishery (Reference 24).

Resources Factor Value: 5 0

SWOF-Food Chain-Toxicity/Persistence/Bioaccumulation

4.1.3.2. WASTE CHARACTERISTICS

4.1.3.2.1. Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source #	Toxicity Factor Value	Persistence Factor Value (Table 4-12)	Bioaccumulation* Value	Toxicity/ Persistence/ Bioaccumulation Factor Value (Table 4-16)	References
Toxaphene	1, 2, 3, 4	1,000	1.0	50,000	50,000,000	1; 2, p. B-18

*The Bioaccumulation Value given is the value listed for brackish water as per References 1, Section 4.1.3.2.1.3; 24.

Toxicity/Persistence/Bioaccumulation Factor Value: 5.0E+07

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

10. Comments by U.S. Army Corps of Engineers on H.R.S. Page 44: Hazardous Waste Quantity (for Food Chain): Erroneous Values Used in Calculation

Problem: As described previously on page 40 comments, site scorers have erroneously calculated the volume of these sites and therefore have an incorrect Hazardous Waste Quantity Assigned Value.

Discussion: The corrected information would show:

Source Number	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is source hazardous constituent quantity data complete? (yes/no)
1	910,000 CY	Yes, as complete as possible for information known to date.
2	?	No
3	0	Yes
4	370,000 CY	Yes, as complete as possible for information known to date.

The highest value is 910,000, which yields a Hazardous Waste Quantity Factor Value of 100, rather than the value of 10,000 that has been scored. (See comments on Page 40 for details, if needed.)

Conclusion: The Hazardous Waste Quantity Factor Value should be revised to 100. This changes the Waste Characteristics Factor Category Value to 180, down from 560.

4.1.3.2.2. Hazardous Waste Quantity

Source Number	Source Hazardous Waste Quantity Value (Section 2.3.4/2.3.5?)	Is source hazardous constituent quantity data complete? (yes/no)
1	55,957.85	No
2	>0	No
3	>0	No
4	>0	No

Sum of values: 55,957.85

4.1.3.2.3. Waste Characteristics Factor Category Value

Toxicity/Persistence Factor Value: 1,000
Hazardous Waste Quantity Factor Value (Reference 1, Table 2-6): ~~10,000~~ 100
Bioaccumulation Potential Factor Value
(Reference 1, Section 4.1.3.2.1.3): 50,000

Toxicity/Persistence Factor Value
x Hazardous Waste Quantity Factor Value: 1.0E + ~~07~~ 05
(1,000 x ~~10,000~~ 100 = 1.0E + ~~07~~ 05)

(Toxicity/Persistence x Hazardous Waste Quantity)
x Bioaccumulation Potential Factor Value: 5.0E+~~11~~ 09
(1.0E+~~07~~ 05 x 50,000 = 5.0E+~~11~~ 09)

Hazardous Waste Quantity Assigned Value: ~~10,000~~ 100
Waste Characteristics Factor Category Value: ~~560~~ 180

4.1.3.3. HUMAN FOOD CHAIN THREAT-TARGETS

Actual Human Food Chain Contamination

Sediment Samples (See maps on pages 4, and 5 of this documentation record for sample locations).

Sample ID	Distance from Probable Point of Entry No. 4	Hazardous Substance	Bioaccumulation Potential Factor Value	Reference(s)
TC-SD-01 (Sediment)	0.55 mile	Toxaphene	50,000	3; 4, p. 266; 9, p. 11
TC-SD-04 (Sediment)	0.77 mile	Toxaphene	50,000	3; 4, p. 269; 9, p. 10
TC-SD-05 (Sediment)	0.25 mile	Toxaphene	50,000	3; 4, p. 270; 9, p. 6
TC-SD-06 (Sediment)	0.17 mile	Toxaphene	50,000	3; 4, p. 271; 9, p. 16
TC-SD-07 (Sediment)	0.31 mile	Toxaphene	50,000	3; 4, p. 272; 9, p. 17
TC-SD-08 (Sediment)	0.61 mile	Toxaphene	50,000	3; 4, p. 273; 9, pp. 16, 17
TC-SD-80 (Sediment)	0.61 mile	Toxaphene	50,000	3; 4, p. 274; 9, pp. 16, 17
TC-SD-09 (Sediment)	1.19 miles	Toxaphene	50,000	3; 4, p. 275; 9, p. 16
TC-SD-10 (Sediment)	1.73 miles	Toxaphene	50,000	3; 4, p. 276; 9, pp. 16, 17
TC-SD-11 (Sediment)	Approximately 30 feet	Toxaphene	50,000	3; 4, p. 277; 9, pp. 14, 15

TC -- Terry Creek
SD -- Sediment Sample

Closed Fisheries

Identity of Fishery

None of the fisheries along the surface water pathway are known to have been closed (Reference 24).

Most Distant Level I Sample
Due to the age of the sampling data, tissue samples collected during earlier investigations were not used to evaluate this site

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

11. Comments by U.S. Army Corps of Engineers on H.R.S. Page 47-50: Actual Human Food Chain Contamination: Erroneous Interpretation of Terminology

Problem: Site scorers have scored a single fishery as if it were three fisheries.

Discussion: The HRS guidance regulations provide no definition for "fishery;" site scorers appear to have inaccurately interpreted the term. Conversations with Georgia DNR's Susan Shipman, manager of DNR's Coastal Resources field office in Brunswick, revealed that the Dupree Creek, Terry Creek and Back River make up a single crab fishery. The site scorers' documented conversation with Mr. Jim Music (who works under Ms. Shipman's supervision) does not verify their assumption that each creek is a separate fishery. Enclosure 6 documents our conversation with Ms. Shipman.

Conclusion: Revise all tables (pages 47 through 50) and revise score on page 50 to show a total Level II Concentrations Factor Value of 0.03.

Level I Fisheries
Level I Fisheries were not evaluated due to the age of the data collected.

Most Distant Level II Sample

Sample ID:
1. TC-SD-10 (Sediment) 9-22-95

Distance from the probable point of entry: Approximately 1.61 miles flowing through Dupree Creek to Terry Creek to the Back River.

References: 2, p. B-56; 3; 4, p. 276; 9, p. 14

Level II Fisheries

Identity of Fishery	Extent of the Level II Fishery (Relative to Probable Point of Entry)
Dupree Creek	The Level II Fishery (established by sampling data) extends from the Hercules outfall for approximately 0.31 mile to the confluence of Terry Creek (References 2, p. B-56; 3; 4, p. 272).
Terry Creek	The Level II Fishery (established by sampling data) extends from the confluence of Dupree and Terry creeks, approximately 1500 feet in Terry Creek (References 2, p. B-56; 3; 4, p. 273; 10, p. 25).
Back River	The Level II Fishery (established by sampling data) extends from Terry Creek to the confluence of Terry Creek and the Back River (References 2, p. B-56; 3; 4, p. 276).

Revise per Comments

4.1.3.3.1. Food Chain Individual

Sample ID:

TC-SD-10

Hazardous Substance:

Toxaphene

Bioaccumulation Potential:

50,000

Food Chain Individual Factor Value (References 1, Section 4.1.3.3.1; 2, p. B-5; 7; 9, pp. 12, 13; 12, p. 1-2).

Identity of Fishery	Type of Surface Water Body	Reference	Dilution Weight
Dupree Creek	River	1, Table 4-13; 3; 8, p. 23	0.0001
Terry Creek	River	1, Table 4-13; 3; 8, p. 23	0.0001
Back River	River	1, Table 4-13; 3; 8, p. 23	0.0001

NOTE: Dupree Creek, Terry Creek, and the Back River are all tidally influenced, and therefore a dilution factor value of 0.0001 was applied (References 1, Section 4.1.3.3.1, Table 4-13; 3; 8, p. 23). The 45 points provided for food chain individual are due to Level II concentrations in sediment (Reference 1, Section 4.1.3.3.1).

revise per comments

Food Chain Individual Factor Value: 45

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

Although contaminated tissue samples were collected in Terry Creek, Dupree Creek and the Back River they were not used to evaluate Level I concentrations due to the age of the data (Reference 25, pp. 5, 13, 37).

==========

Level I Concentrations Factor Value: N/A

...OF Food Chain-Level II Concentrations

4.1.3.3.2.2. Level II Concentrations

Identity of Fishery	Annual Production (Pounds)	Reference(s)	Human Food Chain Population Value
Dupree Creek	>0	1, Table 4-18; 24	0.03
Terry Creek	>0	1, Table 4-18; 24	0.03
Back River	>0	1, Table 4-18; 24	0.03

Sum of Human Food Chain Population Values: ~~0.09~~ 0.03.

~~(0.03 + 0.03 + 0.03) x 1 = 0.09~~
(Reference 1, Section 4.1.3.3.2.1)

recalc per comments

Level II Concentrations Factor Value: ~~0.09~~ 0.03

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

12. Comments by U.S. Army Corps of Engineers on H.R.S. Pages 51: Potential Human Food Chain Contamination Factor Value: Erroneous Estimate.

Observation: The site scorers noted "No known flow information exists for the St. Simons Sound, there fore for scoring purposes a conservative flow rate of 10,000 to 100,000 cfs was assigned." Although the flow rate for Coastal Tidal Water is unnecessary and irrelevant to the dilution factor (determined by using Table 4-13 of 40 CFR 300, Appendix A), the flow rate estimated in this section is inaccurate. The Corps of Engineers has measured the flow rate in St. Simons Sound across the entrance from St. Simons Island and Jekyll Island. A data collection effort in January 1996 by the Corps' Waterways Experiment Station measure the flow and found:

minimum: 150,818 cfs
maximum: 716,802 cfs
average: 457,000 cfs

Perhaps this information will prove useful in upcoming studies or efforts.

SWOF-Food Chain-Potential Human Food Chain Contamination

4.1.3.3.2.3. Potential Human Food Chain Contamination

Identity of Fishes	Annual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Reference	Population Value (P_i)	Dilution Weight (D_i)	P_iD_i
St. Simons Sound	>0	Coastal Tidal Water	Flow Not Applicable	1, Table 4-13, Table 4-18; 24	0.03	0.0001	3.0E-6

NOTE: The water body discussed above is a fishery, however the exact tonnage harvested is unknown (Reference 24). A conservative annual production of greater than 0 has been applied (Reference 1, Table 4-18). No known flow information exists for the St. Simons Sound, therefore for scoring purposes a conservative flow rate of 10,000 to 100,000 cfs was assigned; the corresponding dilution weight is 0.0001 (Reference 1, Table 4-13). Conservative estimates were based on a Brunswick Estuary Modeling Project engineering survey which gives flow rates in the St. Simons Sound to be approximately 583.68 cfs at the widest point (Reference 35, Attachment A, p. 2).

Sum of $P_i \times D_i$: 3.0E-6
(Sum of $P_i \times D_i$)/10: 3.0E-7

See Comments.

Potential Human Food Chain Contamination Factor Value: 3.0E-7

4. .4.2. WASTE CHARACTERISTICS

4.1.4.2.1. Ecosystem Toxicity/Persistence

Hazardous Substance	Source #	*Ecosystem Toxicity Factor Value	Persistence Factor Value	Ecosystem Toxicity/Persistence Factor Value (Table 4.20)	Reference
Toxaphene	1, 2, 3, 4	10,000	1.0	10,000	1; 2, p. B

*The Ecotoxicity Value given is the value listed for brackish water as per References 1, Section 4.1.4.2.1.4; 24.

Ecosystem Toxicity/Persistence Factor Value: 10,000

4.1.4.2. WASTE CHARACTERISTICS

4.1.4.2.2. Ecosystem Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Ecosystem Toxicity Persistence Factor Value	Bioaccumulation Factor Value (Section 4.1.3.2.1.2.)	Ecosystem Toxicity/ Persistence/ Bioaccumulation Factor Value (Table 4-21)	Reference
Toxaphene	10,000	50,000	5.0E+08	1; 2, p. B-18-

Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value: 5.0E+08

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

13. Comments by U.S. Army Corps of Engineers on H.R.S. Page 54: Hazardous Waste Quantity (Environmental Threat): Erroneous Values Used in Calculation

Problem: As described previously on page 40 comments, site scorers have erroneously calculated the volume of these sites and therefore have an incorrect Hazardous Waste Quantity Assigned Value.

Discussion: The corrected information would show:

Source Number	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is source hazardous constituent quantity data complete? (yes/no)
1	910,000 CY	Yes, as complete as possible for information known to date.
2	?	No
3	0	Yes
4	370,000 CY	Yes, as complete as possible for information known to date.

The highest value is 910,000, which yields a Hazardous Waste Quantity Factor Value of 100, rather than the value of 10,000 that has been scored. (See comments on Page 40 for details, if needed.)

Conclusion: The Hazardous Waste Quantity Factor Value should be revised to 100. This revised the Waste Characteristics Factor Category Value to 320, down from 1000.

SWOF-Environment-Hazardous Waste Quantity

4.1.4.2.2. Hazardous Waste Quantity

Source #	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5.)	Is source hazardous constituent quantity data complete? (yes/no)
1	55,957.85	NO
2	>0	NO
3	>0	NO
4	>0	NO

See Comments

Sum of values: 55,957.85

4.1.4.2.3. Waste Characteristics Factor Category Value

Ecosystem Toxicity/Persistence Factor Value: 10,000
Hazardous Waste Quantity Factor Value (Reference 1, Table 2-6): ~~10,000~~ 100
Bioaccumulation Potential Factor Value: 50,000

Ecosystem Toxicity/Persistence Factor Value
x Hazardous Waste Quantity Factor Value: 1.0E+~~08~~ 06
(10,000 x ~~10,000~~ 100 = 1.0E+~~08~~ 06)

(Ecosystem Toxicity/Persistence x Hazardous Waste Quantity)
x Bioaccumulation Potential Factor Value: 5.0E+~~12~~ 10
(1.0E+08 x 50,000 = 5.0E+~~12~~ 10)

As applied to Reference 1, Table 2-7, yields a Waste Characteristics Factor Category Value of ~~1,000.~~ 320

Hazardous Waste Quantity Factor Value: ~~10,000~~ 100
Waste Characteristics Factor Category Value: ~~1,000~~ 320

4.1.4.3. ENVIRONMENTAL THREAT - TARGETS

Level I Concentrations

Toxaphene meets the criteria for an observed release in wetland sediment samples and in a critical habitat for several Federally designated endangered species. However, the conditions for Level I have not been met. Level II environmental targets are used for the purposes of this documentation record (References 1, Section 4.1.4.3.1.1; 4, pp. 171-184).

Level II Concentrations

SAMPLE ID	SAMPLE MEDIUM	LOCATION	REFERENCES
TC-SD-05	sediment	Northwest of dredge spoil 1, in Dupree Creek	9, pp. 6, 7; 38, p. 18
TC-SD-08	sediment	South of dredge spoil area 1, in Terry Creek	9, pp. 16, 17; 38, p. 18
TC-WSD-01*	sediment	The northern bank of Dupree Creek.	9, p. 7; 38, p. 18

* -- Due to tidal influences, TC-WSD-01 is within the upstream target distance limit.

SAMPLE ID	HAZARDOUS SUBSTANCE	CONCENTRATION	REFERENCES
TC-SD-05	Toxaphene	30,000C µg/kg	4, P. 288
TC-SD-08	Toxaphene	2,100 µg/kg	4, P. 273
TC-WSD-01	Toxaphene	46,000C µg/kg	4, p. 279

C -- Confirmed by GCMS, sample is considered valid by U.S. EPA Environmental Services Division (Reference 37).

SAMPLE ID	HAZARDOUS SUBSTANCE	CONCENTRATION	REFERENCES
SD-05	Toxaphene	8,500 µg/kg	10, P. 22
SD-08	Toxaphene	29,000 µg/kg	10, P. 25
WSD-01*	Toxaphene	3,100 µg/kg	10, p. 30

* -- The samples shown in this table reflect the toxaphene task force analyses results (References 38, App. A; 52).
SD -- Sediment
WSD -- Wetland sediment sample

Most Distant Level II Sample

Sample ID:

1. TC-WSD-01 (Sediment)

Distance from the probable point of entry, Hercules Discharge (Source 2): 0.73 mile flowing upstream in Dupree Creek.

References: 3; 38, p. 18

4.1.4.3.1. Sensitive Environments

4.1.4.3.1.1 Level I Concentrations

Nc level I concentrations were not identified in Dupree, or Terry creeks or the Back River, and St. Simons Sound. Therefore, only Level II environmental targets are evaluated for the purposes of this documentation record.

Level I Concentrations Factor Value: N/A

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

14. Comments by U.S. Army Corps of Engineers on H.R.S. Pages 58-59: Level II Concentrations: Incorrect Characterization for Sensitive Environments

Problem: Site scorers have incorrectly identified a score for each potential endangered species that could perhaps be found in the vicinity of the site. Regulations call for the score to be based on sensitive environment -- not on each species. In effect, the site scorers have more than doubled the HRS score. Current score is 325; actual score should be 100.

Discussion: 40 CFR 330, Appendix A, Paragraph 4.1.4.3.1.2 states:

> "Assign value(s) from Table 4-23 to each **sensitive environment** (emphasis added) subject to Level II concentrations."

Site scorers have instead assigned a value for each species found within that sensitive environment. The correct scoring would show:

Sensitive Environment	Sensitive Environment Value	Wetland Frontage Value (0.75 mi)	Total
Terry and Dupree Creeks (one sensitive environment)	75	25	100

We note also that, based on our review of aerial photographs of the creek areas, the wetland frontage value used may be underestimated.

Conclusion: Level II Concentration Factor Value for Sensitive Environments should be revised as discussed above.

4.1.4.3.1.2. Level II Concentrations

Sensitive Environments

Federally Threatened/Endangered Species

TYPE OF SURFACE WATER BODY	FEDERALLY DESIGNATED ENDANGERED/THREATENED SPECIES	SENSITIVE ENVIRONMENT VALUE (6)	REFERENCES
Dupree Creek/ Terry Creek	West Indian Manatee	75	40, p. 1
	Wood Stork	75	41
	Loggerhead Sea Turtle	75	
	Ridley Sea Turtle	75	

Revise per Comments

Wetlands

Wetland	Wetland Frontage	Reference(s)
Dupree Creek	0.75 mile	3; 39

Type of Surface Water Body	Sum of Endangered/ Threatened Species Values (Sj)	Wetland Frontage Value (Wj)	Wj + ~~Sj~~
Dupree Creek	75	25	100
Terry Creek	~~225~~	0	~~225~~

Total

Sum of $W_j + Sj$: ~~325~~

$1(W_j + S_j)$: ~~325~~

Level II Concentration Factor Value: ~~325~~ 100

4.1.4.3.1.3. Potential Contamination

Sensitive Environments

The criteria constituting a Level II release has been met. Therefore, the potential concentration were not evaluated.

Wetlands

The criteria constituting a Level II release has been met. Therefore, the potential concentration were not evaluated.

Potential Contamination Factor Value: NA

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

15. Comments by U.S. Army Corps of Engineers on H.R.S. on pages 60-81: Soil Exposure Pathway: Not Fully Reviewed by Corps of Engineers

Problem: Site scorers based Soil Exposure Pathway Scores on Source 3 which was never used as a Dredged Material Disposal Area.

Discussion: As stated in paragraph 5 above, the "Source 3" site was never used as a dredged material disposal area during the period when contaminated sediments were dredged from the creeks.

Conclusion: Since the entire Soil Exposure Pathway score appears to be based on the fact that contamination was present in this residential trailer area, we assume the entire pathway score would be need to be re-evaluated and perhaps deleted.

SOIL EXPOSURE PATHWAY

5.0.1 General Considerations

Letter (A, B, etc.) by which this area is to be identified: A

Name and description of the area: Contaminated Soil located at the Terry Creek Mobile Housing Park (Source 3). USACE maintained several dredge disposal easements (References 23; 26, Operations Divisions File 1130, p. 1). The area was reportedly used for dredge spoil disposal from November 23, 1938 until Governor Carter stopped dredge spoil activity in 1972 (References 23; 26, Operations File, General, p. 5, Operations File 1130, p. 5). This area is currently utilized as a residential area (References 5, p. 3; 26, Operations File 1130, p. 16).

Background levels were established for all preceding contaminants using background sample concentrations which were designated and collected during the ESI conducted during September 1995 (Reference 9, p. 4).

Chemical Analysis

- Background Concentration

Sample ID	Sampling Location	Depth	Date	Reference(s)
TC-SS-02	Upgradient of Hercules adjacent to the Back River.	0-2 feet bls	9/20/95	9, pp. 5, 7; 38, p. 26

TC -- Terry Creek
SS -- Surface Soil Sample
bls-- below land surface

Sample ID	Hazardous Substance	Concentration	Sample Quantitation Limit**	Reference(s)
TC-SS-02	Toxaphene	--	260 µg/kg	4, p. 42

µg/kg -- micrograms per kilograms
** -- CRQL's are listed when a figure is given in the concentration column. Otherwise the SQL is listed.
TC -- Terry Creek
SS -- Surface Soil Sample
-- Indicates contaminant was not detected in the sample.

Sample ID*	Hazardous Substance	Concentration	Sample Quantitation Limit	Reference(s)
SS-02	Toxaphene	--	170 µg/kg	10, p. 5

* -- The samples shown in this table reflect the toxaphene task force analyses results (Reference 52).
SS -- Surface Soil Sample

- Contaminated Samples

Hazardous Substance	Evidence	Sample Type	Reference
Toxaphene	2,200 µg/kg	TC-SS-04	4, p. 44
Toxaphene	9,300C µg/kg	TC-SS-05	4, p. 45

µg/kg -- micrograms per kilogram
C -- Confirmed by GCMS, Reference 37.
TC -- Terry Creek
SS -- Surface Soil Sample

Chemical Analysis

- Contaminated Samples, continued

Hazardous Substance	Evidence	Sample Type	Reference
Toxaphene	680 µg/kg	SS-04	10, p. 7
Toxaphene	2,200 µg/kg	SS-05	10, p. 8

µg/kg -- micrograms per kilogram
SS -- Surface Soil Sample

Attribution:
Hercules Incorporated produced toxaphene from 1948 through December 1980 (References 16, p. 1; 21). Toxaphene was patented to Hercules in 1951 (Reference 22, p. 1504). Hercules Incorporated reportedly released 200-300 pounds of toxaphene per day to Dupree Creek until the completion of the water treatment system in 1972 (Reference 14). Hercules, Inc. is the only company known to produce toxaphene on the eastern seaboard of Georgia (Reference 36). A dredge spoil easement bordered on the north by Terry Creek was reportedly used for dredge spoil disposal from November 23, 1938 until Governor Carter stopped dredge spoil activity in 1972 (References 23; 26, Operations File, General, p. 5, Operations File 1130, p. 5). This area is currently utilized as a mobile home area (References 5, p. 3; 26, Operations File 1130, p. 16).

SE-Characterization of Area of Observed Contamination
Area Letter: A

Hazardous Constituent Quantity
No information on hazardous constituent quantity was available for this sources.

Hazardous Wastestream Quantity
No information on hazardous wasetream quantity was available for this sources.

Volume
No information on the volume of waste deposited was available on the sources.

Area
The area of contaminated soil could not be determined from two points where level I concentrations were found, therefore, the hazardous waste quantity was determined to be 100 (Reference 1, Section 2.4.2.2).

Area of Observed Contamination Hazardous Waste Quantity Value: 100

Summary of Site Contamination

Level I Samples

Sample Id.	Hazardous Substance	Hazardous Substance Concentration	Benchmark Concentration^	References
TC-SS-04	Toxaphene	2,200 µg/kg	0.58	4, p. 44
TC-SS-05	Toxaphene	9,300C µg/kg	0.58	4, p. 45

µg/kg -- micrograms per kilogram
C -- Confirmed by GCMS, Reference 37.
TC -- Terry Creek
SS -- Surface Soil Sample
^ -- The stated value for the benchmark concentration is the cancer risk screening concentration for toxaphene (Reference 2, p. B-75).

Level II Samples

All contamination found in samples from each locality meet the Level I criteria. Therefore, Level II samples were not evaluated.

5.1 RESIDENT POPULATION THREAT
5.1.1 Likelihood of Exposure

- Location of Population

Sample Identification	Relative to Observed Contamination
TC-SS-04	In the yard of L. Roberts Jr., less than 200 feet from the residence (Reference 46).
TC-SS-05	In on the west end of the mobile home park situated between two residences. Each residence was less than 200 feet from the sample location (Reference 46).

Resident Population Threat Likelihood of Exposure Factor Category Value: 550

5.1.2 Waste Characteristics

5.1.2.1 Toxicity

Hazardous Substance	Toxicity	Reference
Toxaphene	1,000	2, p. B-18

Toxicity Factor Value: 1,000

5.1.2.2 **Hazardous Waste Quantity**

Area Letter	Area Hazardous Waste Quantity Value (Table 5-2)	Hazardous constituent quantity data complete? (yes/no)
A	>0	NO

Sum of values: >0

5.1.2.3 **Waste Characteristics Factor Category Value**

Toxicity Factor Value x Hazardous Waste Quantity Factor Value (Reference 1, Tables 2-7, 5-2): 10 x 1,000

Hazardous Waste Quantity Factor Value: 10
Waste Characteristics Factor Category Value: 10

5.1.3 **Targets**

5.1.3.1 Resident Individual

Area Letter: A
Level of Contamination: Level I
The area of observed contamination, surface soil from the dredge spoil disposal area (source 3). This area includes two residences from the mobile home park and the L. Roberts Jr. residence.

There were three residences or 8 residents occupying houses at the time of level I contamination.

References: 2, pp. B-56, B-57; 4, pp. 44, 45; 10, pp. 7, 8; 42; 43; 46

Resident Individual Factor Value: 50

5.1.3.2 Resident Population

5.1.3.2.1 Level I Concentrations

Area Letter	Residences	County Multiplier	References
A	3	2.57	42; 46

Reference(s): 2, p. B-56; 4, pp. 44, 45; 8, pp. 8, 9; 10, pp. 7, 8; 42; 43; 46

Sum of individuals subject to Level I concentrations: 7 71

Level I Concentrations Factor Value: 77.1

5.1.3.2.2 Level II Concentrations

All residents subject to contamination were evaluated as Level I, therefore, Level II concentrations were not evaluated.

Level II Concentrations Factor Value: NA

5.1.3.3 Workers

The area is a residential area with no known businesses (Reference 42). Therefore, it was assumed that there were no onsite workers.

Total workers:	0
Worker Factor Value:	0
Reference:	42

Workers Factor Value: 0

5.1.3.4 **Resources**

No resources were identified on an area of observed contamination (Reference 3).

Workers Factor Value: 0

5.1.3.5 **Terrestrial Sensitive Environments**
There are no known terrestrial sensitive environments identified in areas of observed contamination (Reference 3).

Likelihood of exposure factor category value (LE):	550
Waste characteristics factor category value (WC):	6
Terrestrial sensitive environments value (ES):	0
Product (LE x WC x ES):	0
(LE x WC x ES)/82,500:	0
Value of EC:	0

Terrestrial Sensitive Environments Factor Value: 0

5.2 NEARBY POPULATION THREAT

5.2.1 Likelihood of Exposure

5.2.1.1 Attractiveness/Accessibility

Area Letter	Description of Area	Value
A	Contaminated soil dredge disposal area. Presently used as residential.housing. The area is accessible and has recreational value (Reference 3).	75

==========

Attractiveness/Accessibiiity Factor Value: 75

5.2.1.2 **Area of Contamination**

Area Letter	Size of Area of Observed Contamination (ft^2)
A	>0

Total Area of Observed Contamination: >0

5.2.1.3 **Likelihood of Exposure Factor Category**

The likelihood of exposure factor for the nearby population threat is based on the values obtained for the attractiveness/accessibility and the area of contamination present at Area A. These values were combined in a matrix to obtain the value for the likelihood of exposure factor category (Reference 1, Tables 5-6, 5-7 and 5-8).

Area of Contamination Factor Value: 5
Nearby Population Threat Likelihood of Exposure Factor Category Value: 25

5.2.2 Waste Characteristics

5.2.2.1 Toxicity

Hazardous Substance	Toxicity	Reference
Toxaphene	1,000	2, p. B-18

Toxicity Factor Value: 1,000

5.2.2.2 **Hazardous Waste Quantity**

Area Letter	Area Hazardous Waste Quantity Value (Table S-2)	Hazardous constituent quantity data complete? (yes/no)
A	>0	NO

Sum of values: >0

5.2.2.3 **Waste Characteristics Factor Category Value**

Toxicity Factor Value x Hazardous Waste Quantity Factor Value: 10 X 1,000

Hazardous Waste Quantity Factor Value: 10
Waste Characteristics Factor Value (Reference 1, Table 2-7): 10

5.2.3 Targets

5.2.3.1 **Nearby Individual**
Approximately 8 level I resident individuals are present; therefore, a value of 0 was assigned to the nearby individual. (See Section 5.2.3.1 of Reference 1).

Nearby Individual Factor Value: 0

5.2.3.2 Population Within 1 Mile

Travel Distance Category	Number of People	Distance-Weighted (Table 5-10)	REFERENCES
>0 - 1/4	190	1	3; 43
>1/4 - 1/2	82	0.7	3; 43
>1/2 - 1	38	0.3	45

Population for the nearby population threat was obtained from the EPA's Graphical Exposure Modeling System (GEMS) Data System, and house counts from topographic maps of the area.

Sum of Distance-weighted Values: 5.0

==========

Population Within 1 Mile Factor Value: 0.5

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
EPA NATIONAL PRIORITIES LIST (NPL) April 1997
OSWER/OERR State, Tribal, and Site Identification Center Washington, DC 20460

TERRY CREEK DREDGE SPOIL AREAS/HERCULES OUTFALL

Brunswick, Georgia

The Terry Creek Dredge Spoil Areas/Hercules Outfall site is located in Brunswick, Georgia. The site consists of four source areas, three disposal areas and the Hercules outfall. The sources border Dupree Creek, Terry Creek and the Back River. From 1948 through December of 1980 Hercules Inc produced toxaphene as its principal product. During this period Hercules (formerly known as Hercules Powder Plant) discharged wastewater directly into Dupree Creek. Areal interpretation of a November 12, 1971 photograph discovered a plume on Dupree Creek emanating from the Hercules outfall. Allegedly in 1966 Hercules Inc released wastewater discharge that contained approximately 250 to 300 pounds of toxaphene per day.

The U.S. Army Corps of Engineers (USACE) Savannah District has been involved in dredging Terry and Dupree Creeks since 1938. Dredged soil had been disposed in three principal areas. Although it is not clear when at some time the sediments dredged from Terry and Dupree Creeks were determined to be contaminated with toxaphene. The largest disposal area used by the USACE during the Terry Creek Project is approximately 16.7 acres. The impoundment construction was such that sediment and water were deposited directly into the spoil area. As the solids settle out of the dredge slurry, water was allowed to drain out of three weirs and back into Terry and Dupree Creeks.

In 1995, the U.S. Environmental Protection Agency, Region 4 conducted an Expanded Site Inspection (ESI). A total of 45 samples were collected during the ESI, including: two groundwater samples collected from private wells; 16 surface soil samples; 16 subsurface soil samples; 12 surface water samples, and 17 sediment samples collected from Dupree and Terry Creeks and the Back River. Samples collected from the impoundment and contaminated dredge areas contained elevated concentrations of toxaphene as well as the sediments of Dupree Creek, Terry Creek and the Back River.

Runoff from the surface impoundment flows north, northeast or toward discharge points into Dupree Creek. From this point of entry, Dupree Creek flows 0.4 mile where it converges with Terry Creek. Terry Creek flows east for 1.3 miles and merges with the Back River. The Back River flows south for approximately 1.8 miles where it empties into the St. Simons Sound. The downstream 15-mile surface water migration pathway terminates in St. Simons Sound. The upstream migration carries runoff and discharge 4,000 feet north to the origin of Dupree Creek. The entire pathway is a recreational fishery, and a habitat for several threatened and endangered species.

[The description of the site (release) is based on information available at the time the site was scored. The description may change as additional information is gathered on the sources and extent of contamination. See 56 FR 5600, February 11, 1991, or subsequent FR notices.]

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

16. Miscellaneous Observations by U.S. Army Corps of Engineers on H.R.S.:
Miscellaneous Observations: Pertinent Information Not Recorded by the HRS Document

16.1 **Observation:** One of our scientists noted an interesting inverse correlation between Toxaphene and Aluminum in the data EPA acquired on Source 1 CDF, with the exception of one outlier (datum that lay outside the observed correlation.) It is unclear whether this is a chance occurrence or the result of some unknown process at work within the disposal area. Since typically you would observe a parallel (rather than inverse) correlation between metals and organic contaminants, this may be of value. For example, what if a test of the inverse relationship between Toxaphene and aluminum presence revealed that the presence of aluminum increased the speed or likelihood of dechlorination of the Toxaphene molecules? This may or may not be true or even significant; we merely note it in case EPA or Hercules chooses to explore the correlation.

16.2 **Observation:** Site scorers appear to have based their conclusions that Hercules spilled Toxaphene in the creeks from a barge on Corps documentation. We note that the Corps documents we provided do not conclusively record that a spill of Toxaphene occurred -- merely that Corps employees in the late 1980s believed one had occurred in the early 1970s. No documents revealed direct knowledge or evidence of such a spill. No information regarding a spill was found in Corps documents dating from the era of the alleged spill.

16.3 **Observation:** The Site Investigation report done in preparation for this site scoring (HRS Reference 4) had many inconsistencies and incorrect assumptions. It misquoted Corps documents and misinterpreted data; its errors lead to many of HRS inaccuracies discussed in previous pages. We can provide you with review comments on this document if you request it.

16.4 **Observation:** The investigation for this Hazard Ranking Score relies on TICs (Tentatively Identified Compounds) with a N or JN notation. Such identifications are very subjective. For N or JN values, the computer was unable to identify a peak with TICs or was not calibrated for the sought compound, and so the chemist uses their experience and judgement to assign a value. Because of the questionable reliability of such data, the Corps of Engineers does not generally allow our contractors to report TICs or rely on such data.

16.5 **Observation:** We have begun researching the dredging of Terry and Dupree Creeks through interviews with Corps employees and retirees. As you may know, Hercules used the Terry Creek channel to transport raw materials -- such as tree stumps -- into the plant area for use in manufacturing chemicals. The stumps were stored in and around Hercules' dock area. Some of these Corps employees and retirees have noted that every time the Terry Creek navigation

channel was dredged, large numbers of stumps were pulled up from the bottom of the creek. Presumably, these stumps could have introduced raw chemical materials into the creek waters as well. The presence of such raw material could potentially influence the results of Toxaphene chemical analyses for creek sediments and dredged material.

16.6 **Observation:** During the 1970s and '80s, Congress provided funding for the maintenance of the Terry Creek Navigable Waterway, the primary beneficiary of which was Hercules, Incorporated . (See table below) Enclosed please find the last Economic Analysis prepared for the Terry Creek project. (Enclosure 7.)

Maintenance Action Taken	Funding (FY)	Comments
FY71: Maintenance Dredging of Terry Creek navigable waterway re-initiated; 57,000 CY of sediment removed; dredging terminated on 13 Jun 1971 at Governor Carter's request	$11,125 (mob/demob Terry Creek) $21,090.00 (dredging Terry Creek)	Total: $32,215.00
FY73: 506,063 CY of sediments dredged from Terry Creek navigable waterway into Confined Disposal Areas (dikes at 12 feet) newly constructed by project sponsors: City, County and State. (Quantity CY and cost taken from Chief's report which is at this time our best available information)	$195,809	Dredging occurred from 5 Sep 72 to 31 Oct 72
FY77 Raised dikes on Terry Creek Dredge Disposal Area ("Source 1") to 15 feet	$41,840	
FY78 Dredged 180,000 CY of sediment from Terry Creek navigable waterway (Actual sediments dredged: 401,327)	$255,510 (dredging Terry Creek) $16,927.00 (1/3 of mob/demob)	Total: $272,437.00
FY82 Raised dikes on Terry Creek Dredge Disposal Area ("Source 1") to 18 feet	$97,400	
FY82 Dredged 208,976 CY of sediment from Terry Creek navigable waterway (Actual sediments dredged: 310,400) Note: This contract included $9,900 for the repair and re-installation of a Spillway Structure; this repair action may have been for the Terry Creek CDF.	$208,976 (dredging Terry Creek) $12,000 (half of mob/demob)	Total: $220,976
FY86 Raised dikes on Terry Creek Dredge Disposal Area ("Source 1") to 22 feet	$523,202	
1987 Dredged 213,380 CY of sediment from Terry Creek navigable waterway (Actual sediments dredged: 333,456)	$293,919	
1988 Dredged 88,000 CY of sediment from Terry Creek navigable waterway (CY estimate by contractor; not verified by Corps records)	$172,220	Paid by lump sum rather than per CY.
TOTAL	$ 1,850,018	
TOTAL (in 1997 dollars)	$3,019,243	

The removal of the contaminated sediments dredged from the creek substantially improved the environmental conditions relative to what those conditions would have been had dredging never occurred. Placement in a confined disposal area, even if small amounts had left containment, substantially improved conditions in the creeks and the surrounding marsh. Had the same problem occurred today, a corrective action of similar approach may have been implemented.

---

17. Conclusions and Recommendations:

17.1 Conclusion Part A:

Although the dredged material disposal site was the initial focus of the site investigation efforts and the Hercules Outfall was added later on, the site should actually focus on the Hercules Outfall and, if the dredged material disposal sites are included at all, only include disposal site(s) as a contaminated area that resulted from the dredging of Terry Creek which was already contaminated with Toxaphene from the Hercules Outfall.

The initial assessment of the "Terry Creek Dredge Spoil Area" resulted from a 1987 Georgia EPD report. The EPD report notably omitted mention of the fact that the creek was still contaminated by Toxaphene from the Hercules Outfall. Perhaps they were unaware of the contamination or they erroneously assumed the dredging of the creeks had removed all contaminants. As a result of this, later investigations of the "Terry Creek Dredge Spoil Area" focused on the dredged material disposal area, and reviewers appear to have only belatedly realized that the actual source of Toxaphene contamination for the area was the Hercules Outfall.

A more correct way to have listed the site would have been to list it simply as "Hercules Outfall." The disposal areas are, at worst, only minor secondary sources of contamination for the creeks and surrounding marshes. The disposal areas would have been addressed more appropriately as an area contaminated by the Hercules Outfall source.

We understand that the EPA's investigation and scoring are distinct regulatory processes with limited flexibility. We understand that changing the focus of an HRS investigation from the dredged material disposal site to the Hercules Outfall could appear arbitrary and capricious and that concern for such an appearance is likely why the two sites were combined. We assume that if the Hercules Outfall was listed without the dredged material disposal areas, the listing process would take longer and be more complex. Wee note, however, that the site title as presently proposed focuses on the minor dredged material disposal areas when the Hercules Outfall is the primary source and concern.

Recommendation: <u>We respectfully suggest that EPA withdraw their proposed NPL listing as is and revise it to focus on the source of contamination -- the Hercules Outfall</u>.

17.2 Conclusion Part B:

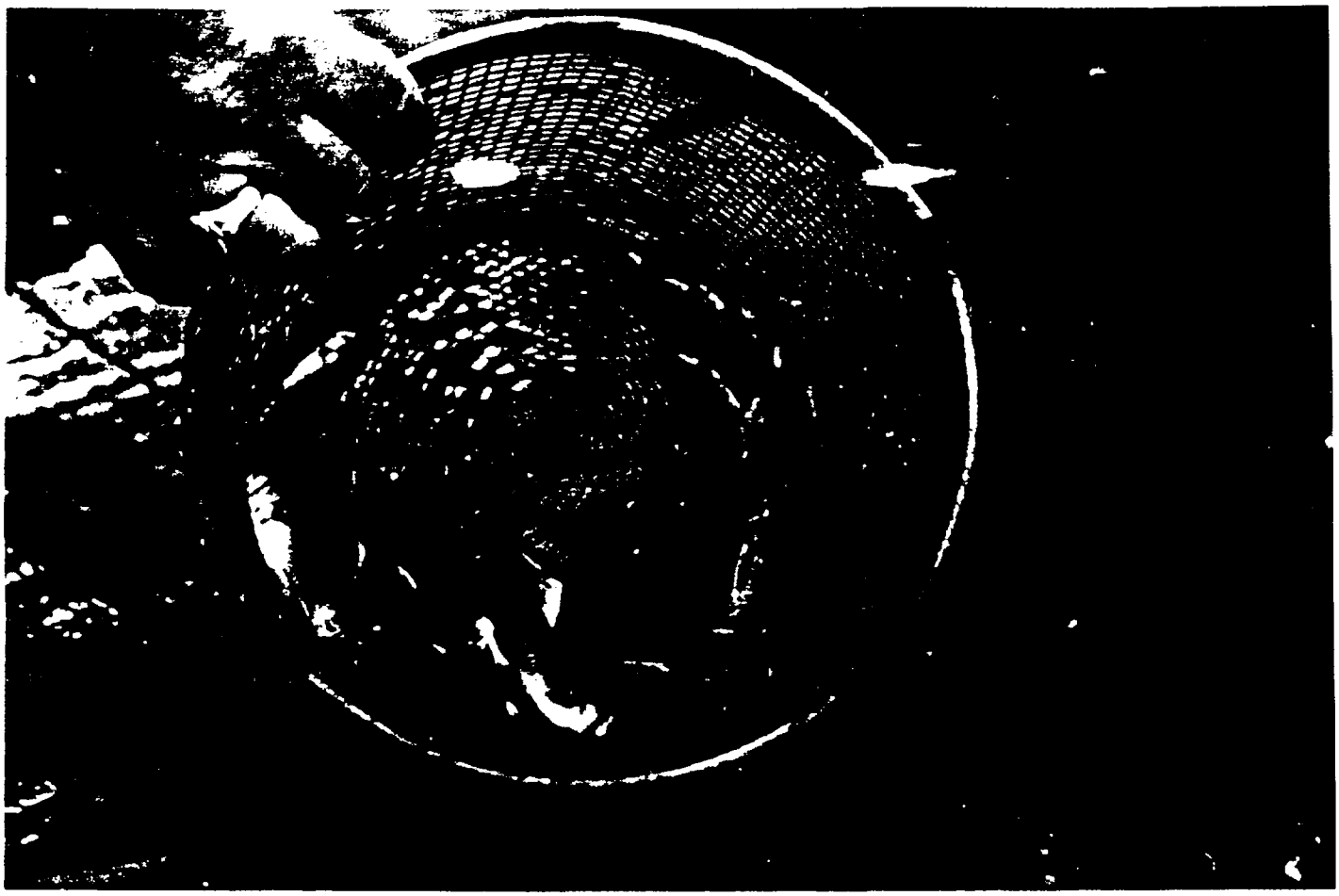
The comments we have offered above prompt many Hazard Ranking System scoresheet line changes. We have included a marked up copy (in red ink) of the affected scoresheet pages to help EPA to assess where the changes must be made. (Enclosure 8)

Recommendation: If EPA elects to pursue listing of this site as proposed, scoresheets should be revised to show accurate scoring per the comments in the body of this comment package.

Comments by U.S. Army Corps of Engineers on HRS Documentation Record Terry Creek Dredge Spoil Areas/Hercules Outfall, EPA ID No. GAD982112658 (Document dated January 31, 1997)

List of Enclosures

1. Copy of Hercules Article referring to "Life is Back in Terry Creek..."
2. Map showing channel boundaries
3. Volume Calculations for CDFs
4. Georgia State regulations (Chapter 391-3-6)
5. Memorandum for Record, Subject: Recreation Designation of Terry Creek Vicinity, 18 Jul 97
6. Memorandum for Record, Subject: Fisheries in the Terry Creek Vicinity, 31 Jul 97
7. Disposition Form, Subject: Maintenance of Terry Creek, Brunswick Harbor, 29 Feb 1988
8. Marked Up Hazard Ranking System Scoresheets



A MILLION DOLLARS' WORTH OF FISH

"Life is back in Terry Creek. Three weeks ago we dragged the creek and for the first time in years found game fish . . . you might say a million dollars' worth of game fish."

The speaker was Jesse Gibson, superintendent of the Brunswick, Georgia, plant. His audience included 40 Georgia civic and government leaders, newspaper reporters, and TV and radio newsmen. The million-dollar fish comment referred to Hercules' initial investment in water pollution abatement facilities at that plant.

The occasion was a unique tour of the sprawling Brunswick operation, the world's largest producer of rosin, turpentine, and pine oil. For the first time at a Hercules plant, government and civic officials and the press were invited in to view pollution abatement projects.

"This new approach probably reflects more a change in the society in which we operate than a reversal of company policy," said Stanley Fenelon, director of operations,

Pine & Paper Chemicals Department, during a luncheon following the tour.

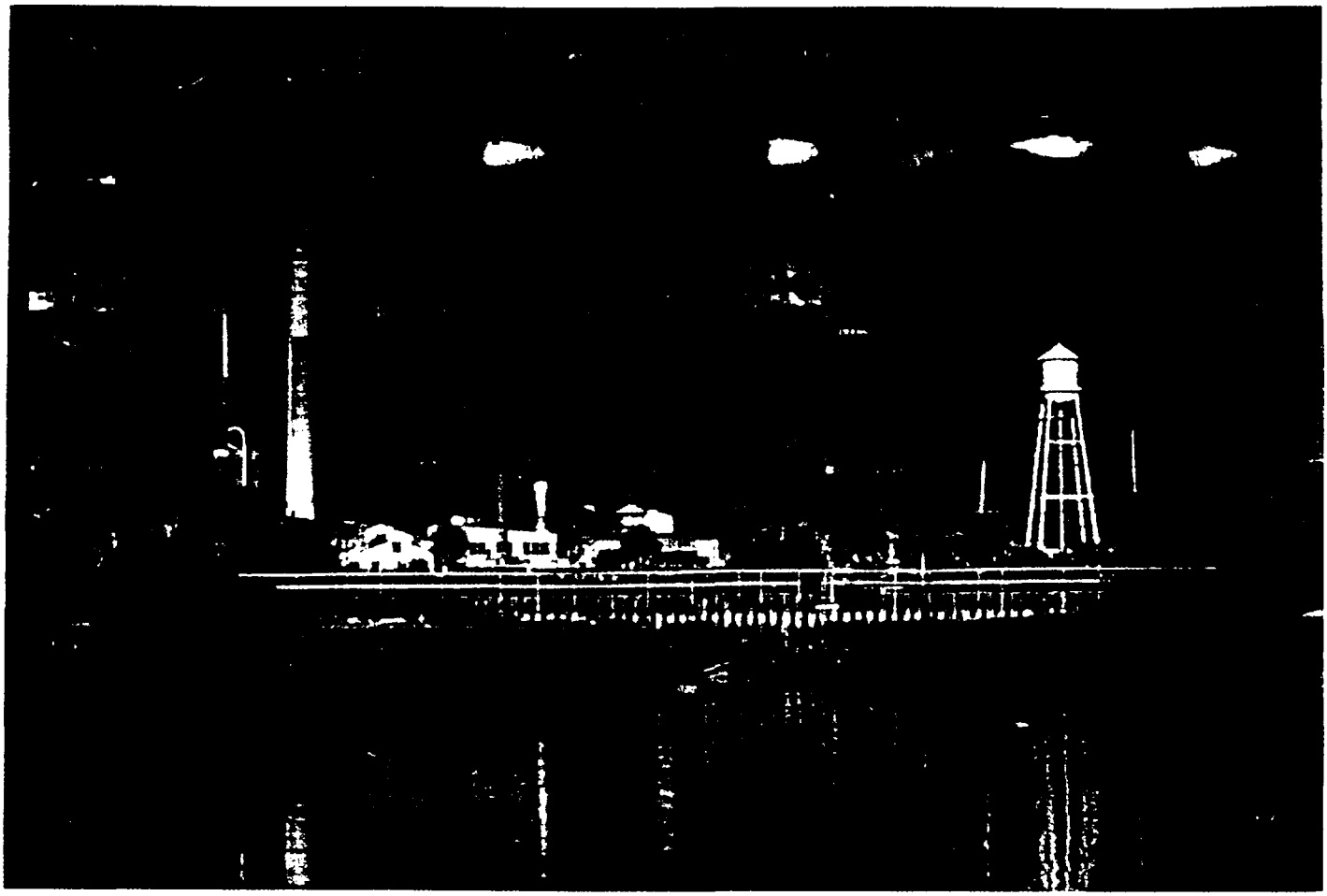
He noted that companies today must keep the public informed of their various activities, especially those dealing with the environment.

For some time prior to the press tour, the Brunswick plant had been under criticism from local and state environmentalists and conservationists because of various discharges into coastal waters and air emissions from plant smokestacks.

When the U. S. Army Corps of Engineers started dredging Terry Creek so ships and barges could reach a new dock at the plant, there was considerable opposition from conservationists. They claimed the dredging would have harmful effects on the famed Marshes of Glynn. Different groups picketed the dredging operation and there was a great deal of publicity against the project and against Hercules. The dock

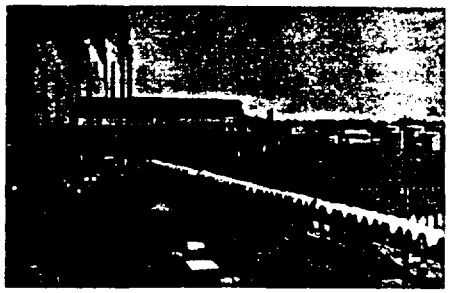
Opposite page: These game fish were taken from Brunswick's Terry Creek. Once pronounced "dead," it now supports many forms of marine life.

Above: A recent tour of the Hercules Brunswick, Georgia, plant, involved government and business leaders and news media representatives. They were given a firsthand view of pollution abatement projects, both completed and underway.



View of plant from Terry Creek near new Hercules dock.

Old Hercules (circa 1925) shows black smoke, once considered a sign of prosperity, billowing from 16 stacks.



was constructed so pine stumps could be barged from the Bahamas to augment diminishing supplies in this country.

In response to the protests, Georgia Governor Jimmy Carter ordered a halt to the dredging.

"It became apparent that many Hercules activities in the Brunswick area were not fully understood by the public," recalled Mr. Fenelon.

He said Hercules had made many pollution abatement improvements through the years. "What was new, of course, was that the standards of emission which were acceptable in the past were superseded by tougher ones."

It was decided that the press and interested government and concerned individuals should be given the opportunity to tour the plant and see firsthand some of the pollution problems and projects.

Visitors saw several major improvements involving more than $1.5 million and another $1 million in projects currently underway. They were

informed that Hercules will help pay for a regional wastewater treatment facility to be built by the city of Brunswick for secondary wastewater treatment.

In addition, those touring the facility were made aware of the fact that the entire Brunswick operation involves a considerable amount of conservation and waste recovery.

The tour prompted some of the following remarks:

"Very impressive" . . . "I had no idea your projects were so involved" . . . "You should be telling everyone what you have accomplished" . . . "You have problems but you are doing something about them."

There was a great deal of favorable news coverage in the Brunswick, Atlanta, Savannah, and Jacksonville newspapers and television and radio stations. A feature article in **Chemical Week** expressed some of the new understanding of the plant's problems. Environment editor Irvin Schwartz wrote, "As visitors were shown around the 320-acre plant site, a slight black plume was seen coming from one of the stacks. William Hansell, director of the state's Environmental Health Division, was asked if he was satisfied with that. 'No,' he said, 'but then neither is Hercules.' "

Ten days after the press tour, Governor Carter toured the plant with several other state officials including R. S. (Rock) Howard, Jr., executive secretary of the Georgia Water Quality Control Board, and Joe Tanner, director of the State Game and Fish Commission. Later he announced approval to renew dredging along Terry Creek.

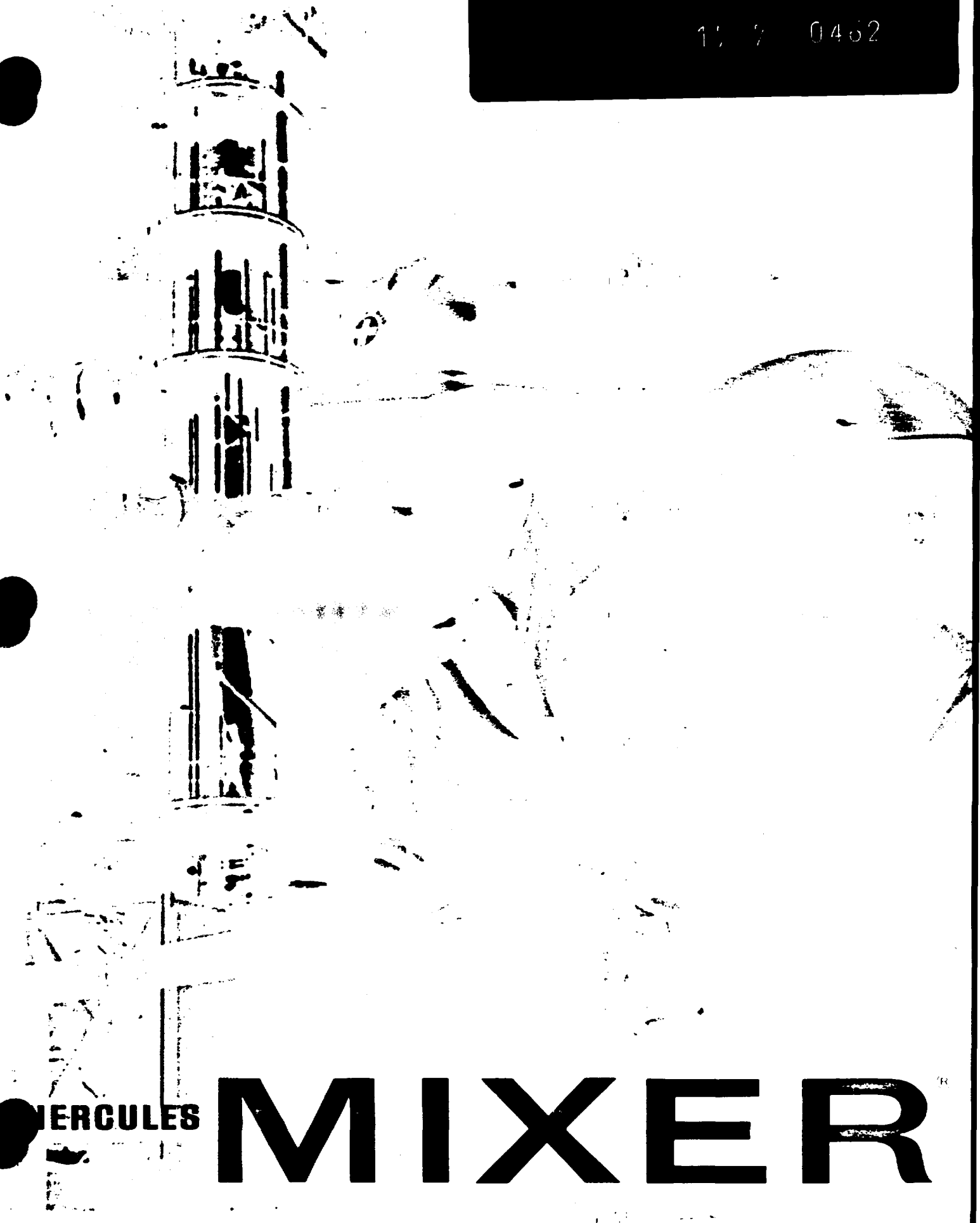
Plant manager Harold E. Hicks noted that the plant tour helped change some misconceptions of the Brunswick facility. "It is readily apparent that government officials with whom we must conduct business now have a better understanding of this plant's needs, products, operations, and economic impact upon the community."

Possibly the finest response to the tour came in the form of a resolution passed by the Brunswick City Commission. It cited the plant for waste recovery activities, supporting civic and city efforts, its partnership for a new city treatment plant, and pollution abatement efforts.

It concluded, "AND BE IT FURTHER RESOLVED that by this action taken the City of Brunswick does recognize Hercules Incorporated as an outstanding entity in this community."

Clean water flowing from Brunswick plant demonstrates strides made in improving the environment.

Soil washed from pine stumps is donated for local landfill. This conserves existing land by reducing need for barrow pits.



HERCULES MIXER®

HERCULES MIXER®

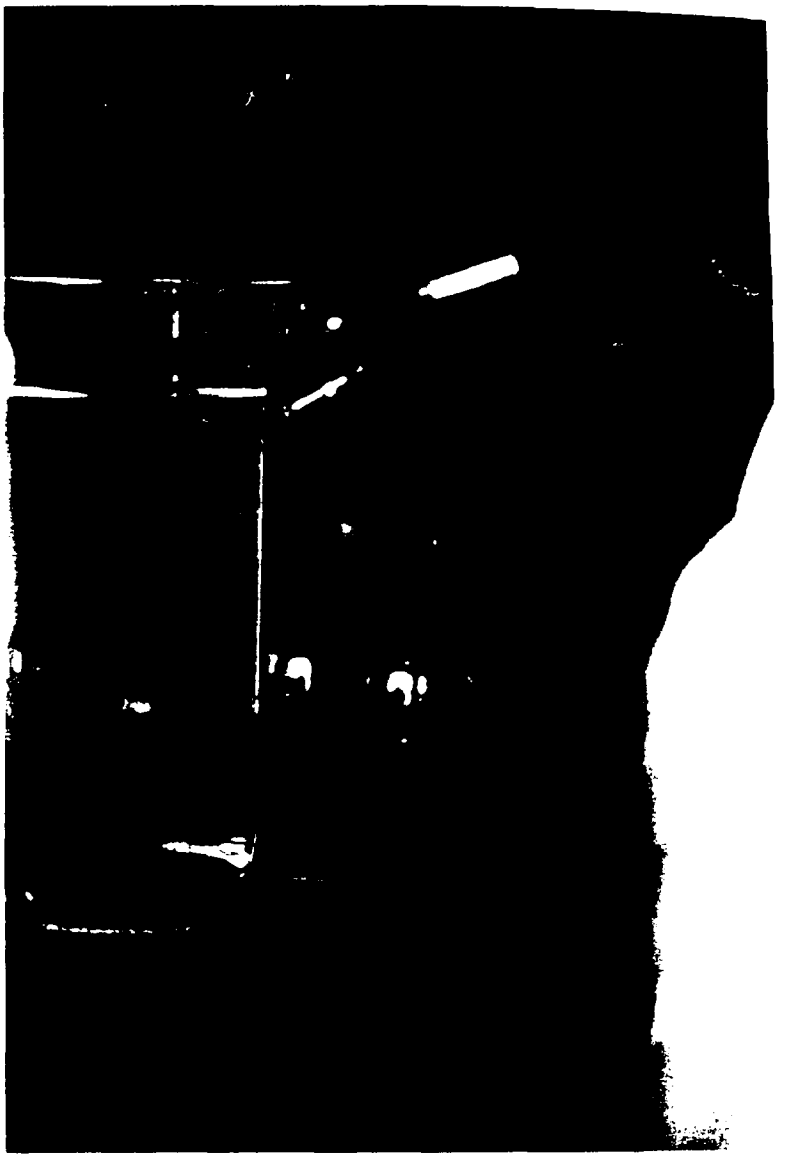
THE HERCULES EMPLOYE MAGAZINE
Published Continuously Since March 1919
NUMBER FOUR — 1971

Editor: Cliff McGoon
Assistant Editor: Hazel C. Isaac
Editorial Assistant: Loretta L. Franz
Staff Art Director: F. W. Shemeley
Staff Photographers:
Marie Bergan
Tom Sharpley
Joe Noonan

Nonstaff photos in this issue by Greg Rettew, pp. 6-11; and Bill Deering, pp. 28-30.

COVER PHOTO: Training on the job here at Hattiesburg, Mississippi, plant involves R. C. Schneider, area supervisor, right, briefing Elzie Jones, operator, in tall oil production.

Published by Hercules Incorporated
Printed in U.S.A.



Training is vital in keeping pace with technological change. Here, training takes the form of an informal exchange of information between Ralph Schranz, senior chemist, and Louise Schleeweis, chemist, at the Research Center near Wilmington.

FORMULA FOR SURVIVAL

OVERSIZED

DOCUMENT

Site: **TERRY CREEK DREDGE SPOIL AREA**

Break: **17.7**

Page 0466 does not exist due to a pagination error.

CESAS-OP-SR/EN-HC 11 Sep 97

MEMORANDUM FOR RECORD

SUBJECT: Quantification of Dredged Material Disposal for Terry Creek Project

1. In researching issues relevant to the review of documentation related to the proposed listing of the "Terry Creek Dredge Spoil Area/Hercules Outfall" on the National Priorities List, additional information has been located pertinent to estimating volumes of material disposed. For ease of reference, we have assembled the tables in Enclosure 1 to show when different dredging and dike maintenance activities occurred. Table 1 of this memorandum provides estimates of the final volumes remaining in the identified dredged material disposal locations:

TABLE 1: Estimated Dredged Material Volumes in Terry Creek Disposal Areas After Desiccation

Year	Source 1, CY	Source 3	Source 4, CY	Tract 1, CY
FY71	0	0	0	50,000
FY73	170,000	0	205,000	0
FY78	160,000	0	165,000	0
FY82	270,000	0	0	0
FY87	280,000	0	0	0
FY88	30,000	0	0	0
TOTALS	910,000	0	370,000	50,000
			GRAND TOTAL ALL COLUMNS:	1,330,000 CY

2. The volumes in Table 1 have been calculated by taking the best available data on initial in-situ channel volume or material placed into the disposal area and applying a bulking factor and then performing estimates of shrinkage due to drying of the material. The estimates of bulking and drying were performed using typical engineering properties of sediment in the Brunswick Harbor area.

3. The estimate of the initial in-situ channel volume of material that was placed into each disposal area by dredging

CESAS-OP-SR/EN-HC
SUBJECT: Quantification of Dredged Material Disposal for Terry Creek Project

contract is shown in Table 2. These volumes are based on various sources and calculations.

TABLE 2: Estimated Dredged Material Volumes in Terry Creek Disposal Areas Before Desiccation

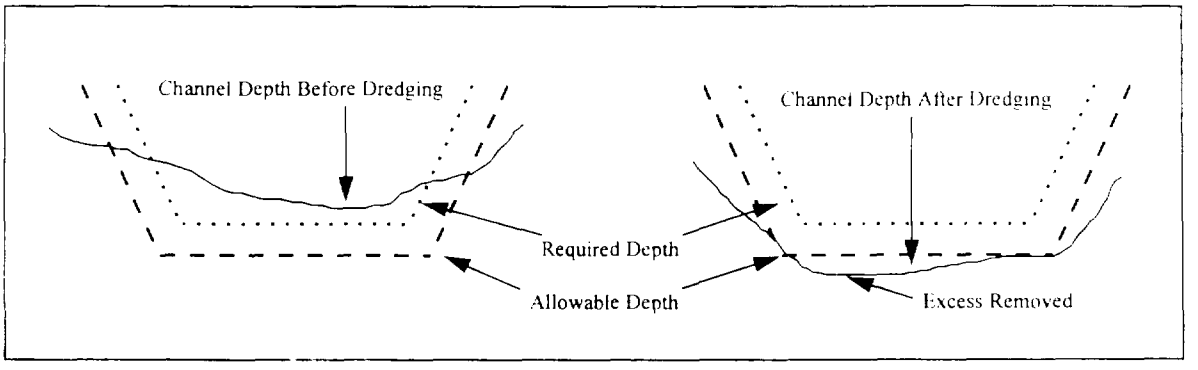
Year	Source 1	Source 3	Source 4	Tract 1
FY71	0	0	0	57,000
FY73	calculated estimate 267,201	0	calculated estimate 238,862	0
FY78	probably 211,955	0	probably 189,372	0
FY82	310,400	0	0	0
FY87	333,456	0	0	0
FY88	87,183	0	0	0
TOTALS	1,210,195	0	428,234	57,000
			GRAND TOTAL ALL COLUMNS:	1,695,429 CY

a. When available, Savannah District dredging records have been used to provide total volume dredged by contract. Dredging contracts are typically paid on a per cubic yard basis. To understand the volume computations a brief description of the dredging contract is summarized in paragraph 3b below. Additional details about specific data and sources are provided in Paragraphs 4 and 5 below.

b. The dredging contractor is given a specific channel geometry to dredge. The contractor is also given a required channel cross section to be provided at the completion of dredging. Typically, 1 vertical on 3 horizontal side slopes are required and a required bottom depth and width are specified. In addition, there is generally a 2 foot allowable overdepth located beneath the required depth. In this allowable overdepth prism, the Contractor is paid for material removed but he is not required to remove this

material. A typical channel cross section is shown in Figure 1 with the required depth and allowable overdepth labeled. The allowable overdepth helps offset the inaccuracies of the hydraulic dredging process.

Figure 1: Required Depth and Allowable Overdepth



c. When dredging quantities are calculated for a navigation channel they are based on hydrographic channel surveys of the in-situ material. The area is surveyed before dredging and again after dredging. The difference between the two surveys is the volume the Contractor removed. The contractor is only paid for "credited yardage" which is yardage removed from the required channel and allowable overdepth prism. The Contractor also removes "excess material" which is material below the overdepth prism for which he is not paid. Total volume dredged (including both credited yardage and excess material) is normally computed and recorded since total volume is important to calculating disposal area capacity used and available.

d. When material is dredged using a hydraulic cutterhead dredge, water is mixed with the sediments to transport the material through a pipeline to the disposal area. As the fine-grained silt sediments are disturbed and transported to the disposal area, the void ratio of the material is increased and the volume increases. The initial

CESAS-OP-SR/EN-HC
SUBJECT: Quantification of Dredged Material Disposal for Terry Creek Project

volume that is placed into the upland disposal area is larger than the in-situ channel volume by what is called the bulking factor. As the dredged material dewaters over time the excess water is released from the pores in between the sediment particles and the material consolidates. The drying process is called desiccation. Table 1 estimates material remaining after desiccation that has occurred up to 1997.

4. This paragraph provides the sources that were used for information on the volumes of material dredged. Paragraph 5 provides information on the placement of that dredged material.

a. Table 3 below lists the available records for dredging contracts used to estimate the total volumes removed from the Terry Creek navigation channel.

TABLE 3: Data Taken From Savannah District's Payment Estimate - Contract Performance (ENG Form 93) -- Final Estimates

Contract	Range	Total Volume Removed
DACW21-78-C-0029	Terry Creek Sec 2	211,955
DACW21-78-C-0029	Terry Creek Sec 1	189,372
DACW21-82-C-0074	Terry & Dupree Creeks	310,400
DACW21-87-C-0023	Terry Cr Sta 1+680+10+940	333,456

b. For contracts where dredging records were not available, the dredged volumes were estimated using the information provided in the Chief of Engineer's Annual Report to Congress. The official account of work completed is and has been recorded each year in the Chief of Engineer's Annual Report to Congress. Enclosure 1 summarizes the pertinent portions of each report that pertain to Terry Creek. Chief's Report records the "credited

yardage" dredged rather than the total yardage removed. For lack of more accurate information, the Chief's Report figures for 1971 and 1973 were used to calculate the amount dredged.

c. No volume was recorded in available records for dredging contracts for the FY88 dredging episode since the contract was paid in lump sum rather than by yardage. Therefore, we contacted Tom Wright and his secretary Melanie at the Wright Dredging Company (which possesses the records for out-of-business Atkinson Dredging.) Their records showed that the dredge *Hampton Roads* had removed 87,183 CY at Terry Creek project that year. This is the quantity we used.

5. The other focus of our research was when material had or had not been placed on the "Source 4" dredged material disposal area.

a. We reviewed electronic dredging records from the FY87 and FY88 dredging episodes and examined the recorded length of the discharge pipes. The pipeline lengths indicated that as the dredge started work at the mouth of the creek, the pipeline lengths were very long and therefore indicated the material had been placed at the "Source 1" dredged material disposal area.

b. Review of a similar handwritten dredging record from FY82 at first lead us to believe that some of the material had been placed in the "Source 4" site. However, when we reviewed aerial photographs taken 6 months after dredging was complete, there was no indication of the placement of dredged material on the "Source 4" site. Since the amount of sediments indicated by the record would have been extensive, we have interpreted the conflicting data to mean that the handwritten record must be in error. The material must have been placed in the "Source 1" site.

CESAS-OP-SR/EN-HC
SUBJECT: Quantification of Dredged Material Disposal for Terry Creek Project

c. The exact placement of dredged sediments from the FY78 dredging episode is still uncertain. Table 3 shows Terry Creek records in two sections; this could mean placement in two different sites or simply two different acceptance sections or something else altogether. Also, Hercules records contain a letter of permission dated 15 October 1977 given to the Corps by the Partnership Sell (formerly Riverside Development) granting the Corps permission to use their land as a disposal area for a 12-month period. Although there is no definitive information to show it was so, we have gone forward with our estimate on the premise that the 1978 dredging episode placed sediments in two disposal areas ("Source 1" and "Source 4") rather than one disposal area ("Source 1".) As we acquire more information through interviews and miscellaneous sources, we may be able to determine whether the "Source 4" site was used in the 1978 dredging cycle.

d. We assumed that material was placed onto the "Source 4" site in FY73 when the first serious re-dredging of the creeks occurred. We do not know how much material was placed in each area. We have therefore assumed a reasonable proportion of 52% "Source 1" site to 48% "Source 4" site. This is based on the quantities noted for Section 1 and Section 2 of Terry Creek from the FY78 dredging. In the event that new information becomes available indicating something different occurred, we will revise our estimate.

e. At the time we prepared and sent our 1992 letter to EPA, we believed that dredged material may have been placed on the "Source 3" site (known to us as "Tract 2"). Further research has indicated that this is probably incorrect. The 57,000 CY of dredged sediments from the FY71 dredging episode were more likely placed on "Tract 1" (which lies east of Tract 2) at the confluence of Terry Creek and the Back River.

CESAS-OP-SR/EN-HC
SUBJECT: Quantification of Dredged Material Disposal for Terry Creek Project

6. This represents our best estimate of quantities in the dredge disposal areas adjacent to the Terry Creek project based on information known to date. Desiccation calculations were performed by Susan Brinson, EN-HC. If additional information is found, we will modify these estimates as appropriate.

2 Encls

Kathleen A. Morgan
KATHLEEN A. MORGAN
Environmental Compliance
Coordinator, Operations
Division

Enclosure 1:
Summary of Dredging and Dike Raising Episodes

DREDGING EPISODE INFORMATION

FY	CONTRACT NUMBER	CONTRACTOR	NAME OF DREDGE	VOLUME DREDGED	PLACEMENT OF SEDIMENTS
FY 71	DACW21-71-C-0064	J.A. LaPorte	Arlington	57,000	"Tract 1"
FY 73	*Record not available*	*Record not available: Clarendon known to belong to* J. A. LaPorte	Clarendon	506,063	Source 1 and probably Source 4
FY 78	DACW21-78-C-0029	Parkhill-Goodloe, Inc	Dauntless	401,327	Source 1 and possibly Source 4
FY 82	DACW21-82-C-0074	Southern	Jekyll Island (smaller 16-inch pipe-line dredge)	310,400	Source 1
FY 87	DACW21-87-C-0023	Southern	Cherokee	333,456	Source 1
FY 88	DACW21-88-C-0039	Atkinson	Hampton Roads	88,000	Source 1

DIKE RAISING EPISODE INFORMATION

FY	CONTRACT NUMBER	CONTRACTOR	DATES	COMMENTS
FY 78	DACW21-77-C-0102	Sayler Marine Corp, Savannah	Awarded: 2 Sep 1977 Completed: 12 Jan 1978	"Reconstruction of Terry Creek Dike": $41,840.00 - raised to 15 feet?
FY 82	DACW21-82-C-0033	Mixon Contracting, Inc, Waycross	Period Covered by Estimate: 19 Apr 1982 through 4 Oct 1982 Required Completion Date: 23 Oct 1982	"Raising Terry Creek Disposal Dike" CA0943312A82B14 $97,400.00 - raised to 18 feet?
FY 86	DACW21-86-C-0049	Atlanta Recreational Contractors, Inc, Roswell, GA	Period Covered by Estimate: 11 Aug 86 through 23 Apr 87 Required Completion Date: 3 Apr 87	"Raising and Repair of Terry Creek Disposal Area Dikes" $523,202.43 Included Removal & Installation of Weirs, and Repair damaged weirs and install expansion joints - raised to 22 feet?

Enclosure 2:
Summary of Information Excerpted from Chief of Engineers' Annual Reports

Year	Excerpts Regarding Terry Creek from Savannah District Section of Chief of Engineers' Annual Report
FY 71	A continuing contract for maintenance dredging of East River and Terry Creek was awarded April 29, 1971 and work commenced May 13, FY 71. During the period May 13, 1971 through June 30, 1971, contract pipeline dredge *Arlington* removed 421,759 cubic yards of material (57,000 cubic yards from Terry Creek) for a total of $136,739, including inspection, overhead, and other costs. Dredging operations in Terry Creek were stopped on June 13, 1971 at the request of Governor Jimmy E. Carter of the state of Georgia, based on his concern for environmental impact of placing spoil material in marsh area. Resumption of the work has been postponed until local interests have furnished spoil areas satisfactory to Governor Carter.
FY 72	As a result of the work stoppage for environmental reasons in FY 71, a plan of disposal for material dredged from Terry Creek was developed which meets the requirements of State and Federal pollution control. Local interests acquired necessary disposal area and are constructing retaining dikes so that dredging can be resumed in FY 73. The contractor was paid $67,486 in FY 72 for work performed late in FY 71. A contract was executed for monitoring the effects of toxaphene, resulting from dredging and spoil disposal, on the environment.
FY 73	Dredging operations in Terry Creek, stopped on June 13, 1971 by Governor Jimmy E. Carter of the State of Georgia, were resumed after local interests furnished suitable retention spoil areas acceptable to the Governor. During the period September 5, 1972 to October 31, 1972, the contract pipeline dredge *Clarendon* removed 506,063 cubic yards of material at a total cost of $195,809, including inspection, overhead, and other government costs.
FY 74-77	No entries regarding Terry Creek dredging actions.
FY 78	A contract for maintenance dredging of East River and Terry Creek was awarded January 4, 1978. The contractor Dredge *Dauntless* removed 478,846 cubic yards of material from Terry Creek during the period of January 4, 1978 to May 2, 1978 at a total cost of $634,882 including inspection, administration and other government costs. A contract to reconstruct Terry Creek dike was awarded September 2, 1977 and completed January 12, 1978 at a total cost of $44,824.
FY 79- 81	No entries regarding Terry Creek dredging actions.
FY 82	The contract to raise the dikes in the Terry Creek disposal area was awarded March 9, 1982. The work began April 19, 1982, and was completed September 14, 1982, at a total cost of $114,987.
FY 83	A contract for dredging in the East River and Terry Creek was awarded September 24, 1983. The contract dredge *Cherokee* removed 1,349,589 cubic yards of material from sta 27+20 to 41+80 and sta 24+00 to 126+00 during the period of October 27, 1982, through March 3,1983, at a total cost of $870,496 including inspection, administration and other government costs.
FY 84-86	No entries regarding Terry Creek dredging actions.
FY 87	...and $545,535 was spent on contract dredges for the Terry Creek and East River projects.
FY 88	No entries regarding Terry Creek dredging actions.
FY 89	A total of two maintenance projects were completed in the Brunswick Harbor during FY 89. They were both dredging of East River. The District used two contractors to dredge the East River twice during the fiscal year. The contractor was Atkinson Dredging Company, of Chesapeake, Virginia. Their dredge the Hampton Roads, removed 194,622 cubic yard of silt at a total contract price of $504,573. Later during the fiscal year, it became necessary for another contract to remove shoaling that had occurred after the previous contract. Southern Dredging Company used the pipeline dredge Clinton to remove 377,397 cubic yards at a price of $414,697.... NOTE: Although Annual Report does not specifically refer to Terry Creek, it was included in Atkinson's contract to dredge East River.
FY 90 on	No entries regarding Terry Creek dredging actions.

RULES AND REGULATIONS FOR WATER QUALITY CONTROL

CHAPTER 391-3-6

REVISED - MAY 22, 1997

GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
205 BUTLER STREET, SE
FLOYD TOWERS EAST
ATLANTA, GEORGIA 30334

(i) No new point source discharges or increases in the discharge of pollutants above permitted level from existing point source discharges to ONRW shall be allowed.

(ii) Existing point source discharges to ONRW shall be allowed, provided they are treated or controlled in accordance with applicable laws and regulations.

(iii) New point source discharges or expansions of existing point source discharges to waters upstream of, or tributary to, ONRW shall be regulated in accordance with applicable laws and regulations, including compliance with water quality criteria for the use classification applicable to the particular water. However, no new point source discharge or expansion of an existing point source discharge to waters upstream of, or tributary to, ONRW shall be allowed if such discharge would not maintain and protect water quality within the ONRW.

(d) In applying these policies and requirements, the State of Georgia will recognize and protect the interest of the Federal Government in interstate and intrastate (including coastal and estuarine) waters. Toward this end the State will consult and cooperate with the Environmental Protection Agency on all matters affecting the Federal interest.

*Applicable to Intrastate and Interstate Waters of Georgia.

(3) **Definitions.** All terms used in this paragraph shall be interpreted in accordance with definitions as set forth in the Act and as otherwise herein defined:

(a) "Biological integrity" is functionally defined as the condition of the aquatic community inhabiting least impaired waterbodies of a specified habitat measured by community structure and function.

(b) "Coastal waters" are those littoral recreational waters on the ocean side of the Georgia coast.

(c) "Existing instream water uses" include water uses actually attained in the waterbody on or after November 28, 1975.

(d) "Intake temperature" is the natural or background temperature of a particular waterbody unaffected by any man-made discharge or thermal input.

(e) "Reasonable and necessary uses" means drinking water supplies, conservation, protection, and propagation of fish, shellfish, wildlife and other beneficial aquatic life, agricultural, industrial, recreational, and other legitimate uses.

(f) "Secondary contact recreation" is incidental contact with the water, wading, and occasional swimming.

(g) "Shellfish" refers to clams, oysters, scallops, mussels, and other bivalve mollusks.

(h) "Water" or "waters of the State" means any and all rivers, streams, creeks, branches, lakes, reservoirs, ponds, drainage systems, springs, wells, wetlands, and all other bodies of surface or subsurface water, natural or artificial, lying within or forming a part of the boundaries of the State which are not entirely confined and retained completely upon the property of a single individual, partnership, or corporation.

(4) **Water Use Classifications.** Water use classifications for which the criteria of this Paragraph are applicable are as follows:

(a) Drinking Water Supplies
(b) Recreation
(c) Fishing, Propagation of Fish, Shellfish, Game and Other Aquatic Life
(d) Wild River
(e) Scenic River
(f) Coastal Fishing

(5) **General Criteria for All Waters.** The following criteria are deemed to be necessary and applicable to all waters of the State:

(a) All waters shall be free from materials associated with municipal or domestic sewage, industrial waste or any other waste which will settle to form sludge deposits that become putrescent, unsightly or otherwise objectionable.

(b) All waters shall be free from oil, scum and floating debris associated with municipal or domestic sewage, industrial waste or other discharges in amounts sufficient to be unsightly or to interfere with legitimate water uses.

(c) All waters shall be free from material related to municipal, industrial or other discharges which produce turbidity, color, odor or other objectionable conditions which interfere with legitimate water uses.

(d) Turbidity. The following standard is in addition to the narrative turbidity standard in Paragraph 391-3-6-.03(5)(c) above:

All waters shall be free from turbidity which results in a substantial visual contrast in a water body due to a man-made activity. The upstream appearance of a body of water shall be as observed at a point immediately upstream of a turbidity-causing man-made activity. That upstream appearance shall be compared to a point which is located sufficiently downstream from the activity so as to provide an appropriate mixing zone. For land disturbing activities, proper design, installation, and maintenance of best management practices and compliance with issued permits shall constitute compliance with Paragraph 391-3-6-.03(5)(d).

(e) All waters shall be free from toxic, corrosive, acidic and caustic substances discharged from municipalities, industries or other sources, such as nonpoint sources, in amounts, concentrations or combinations which are harmful to humans, animals or aquatic life.

17 7 0480

(ii) pH: Within the range of 6.0 - 8.5.

(iii) Bacteria: For the months of May through October, when water contact recreation activities are expected to occur, fecal coliform not to exceed a geometric mean of 200 per 100 ml based on at least four samples collected from a given sampling site over a 30-day period at intervals not less than 24 hours. Should water quality and sanitary studies show fecal coliform levels from non-human sources exceed 200/100 ml (geometric mean) occasionally, then the allowable geometric mean fecal coliform shall not exceed 300 per 100 ml in lakes and reservoirs and 500 per 100 ml in free flowing freshwater streams. For the months of November through April, fecal coliform not to exceed a geometric mean of 1,000 per 100 ml based on at least four samples collected from a given sampling site over a 30-day period at intervals not less than 24 hours and not to exceed a maximum of 4,000 per 100 ml for any sample. The State does not encourage swimming in surface waters since a number of factors which are beyond the control of any State regulatory agency contribute to elevated levels of fecal coliform. For waters designated as approved shellfish harvesting waters by the appropriate State agencies, the requirements will be consistent with those established by the State and Federal agencies responsible for the National Shellfish Sanitation Program. The requirements are found in the National Shellfish Sanitation Program Manual of Operation, Revised 1988, Interstate Shellfish Sanitation Conference, U. S. Department of Health and Human Services (PHS/FDA), and the Center for Food Safety and Applied Nutrition. Streams designated as generally supporting shellfish are listed in Paragraph 391-3-6-.03(14).

(iv) Temperature: Not to exceed 90°F. At no time is the temperature of the receiving waters to be increased more than 5°F above intake temperature except that in estuarine waters the increase will not be more than 1.5°F. In streams designated as primary trout or smallmouth bass waters by the Wildlife Resources Division, there shall be no elevation of natural stream temperatures. In streams designated as secondary trout waters, there shall be no elevation exceeding 2°F natural stream temperatures.

(d) Wild River: For all waters designated in 391-3-6-.03(13) as "Wild River," there shall be no alteration of natural water quality from any source.

(e) Scenic River: For all waters designated in 391-3-6-.03(13) as "Scenic River," there shall be no alteration of natural water quality from any source.

(f) Coastal Fishing: This classification will be applicable to specific sites when so designated by the Environmental Protection Division. For waters designated as "Coastal Fishing", site specific criteria for dissolved oxygen will be assigned and detailed by footnote in Section 391-3-6-.03(3), "Specific Water Use Classifications." All other criteria and uses for the fishing use classification will apply for coastal fishing.

(7) **Natural Water Quality.** It is recognized that certain natural waters of the State may have a quality that will not be within the general or specific requirements contained herein. This is especially the case for the criteria for dissolved oxygen, temperature, pH and fecal coliform. NPDES permits and best management practices will be the primary mechanisms for ensuring that discharges will not create a harmful situation.

(8) **Treatment Requirements.** Notwithstanding the above criteria, the requirements of the State relating to secondary or equivalent treatment of all waste shall prevail. The adoption of these criteria shall in no way preempt the treatment requirements.

(9) **Streamflows.** Specific criteria or standards set for the various parameters apply to all flows on regulated streams. On unregulated streams, they shall apply to all streamflows equal to or exceeding the 7-day, 10-year minimum flow (7Q10). All references to 7-day, 10-year minimum flow (7Q10) also apply to all flows on regulated streams. All references to annual average stream flow also apply to long-term average stream flow conditions.

(10) **Mixing Zone.** Effluents released to streams or impounded waters shall be fully and homogeneously dispersed and mixed insofar as practical with the main flow or water body by appropriate methods at the discharge point. Use of a reasonable and limited mixing zone may be permitted on receipt of satisfactory evidence that such a zone is necessary and that it will not create an objectionable or damaging pollution condition. Protection from acute toxicity shall be provided within any EPD designated mixing zone to ensure a zone of safe passage for aquatic organisms. The procedure is as described in paragraph 391-3-6-.06(4)(d)(5)(vi), except that the numerical pass/fail criteria applies to the end-of-pipe without the benefit of dilution provided by the receiving stream.

(11) **Toxic Pollutant Monitoring.** The Division will monitor waters of the State for the presence or impact of Section 307 (a)(l) Federal Clean Water Act toxic pollutants, and other priority pollutants. The monitoring shall consist of the collection and assessment of chemical and/or biological data as appropriate from the water column, from stream bed sediments, and/or from fish tissue. Specific stream segments and chemical constituents for monitoring shall be determined by the Director on the basis of the potential for water quality impacts from toxic pollutants from point or nonpoint waste sources. Singularly or in combination, these constituents may cause an adverse effect on fish propagation at levels lower than the criteria. Instream concentrations will be as described in 391-3-6-.03 (5)(d). Additional toxic substances and priority pollutants will be monitored on a case specific basis using Section 304(a) Federal Clean Water Act guidelines or other scientifically appropriate documents.

(12) **Fecal Coliform Criteria.** The criteria for fecal coliform bacteria provide the regulatory framework to support the USEPA requirement that States protect all waters for the use of primary contact recreation or swimming. This is a worthy national goal, although potentially unrealistic with the current indicator organism, fecal coliform bacteria, in use today. To assure that waters are safe for swimming indicates a need to test waters for pathogenic bacteria. However, analyses for pathogenic bacteria are expensive and results are generally difficult to reproduce quantitatively. Also, to ensure the water is safe for swimming would require a whole suite of tests be done for organisms such as Salmonella, Shigella, Vibrio, etc. as the presence/absence of one organism would not document the presence/absence of another. This type of testing program is

Oconee River	Sinclair Dam to Georgia Hwy. 22	Drinking Water
Oconee River	Georgia Hwy. 57 to U.S. Hwy. 80	Drinking Water

UPPER OCMULGEE RIVER		CLASSIFICATION
Big Haynes Creek	Georgia Hwy. 20 to Bald Rock Road	Drinking Water
Alcovy River	Georgia Hwy. 81 to City of Covington Water Intake	Drinking Water
Yellow River	Georgia Hwy. 124 to Porterdale Water Intake	Drinking Water
Jackson Lake	From South River at Georgia Hwy. 36; from Yellow River at Georgia Hwy. 36; from Alcovy River at Newton Factory Road Bridge to Lloyd Shoals Dam	Recreation
g Haynes Creek	Georgia Highway 78 to Confluence with the Yellow River	Drinking Water

LOWER OCMULGEE RIVER BASIN		CLASSIFICATION
Towaliga River	Headwaters to Georgia Hwy. 36	Drinking Water
Towaliga River	Georgia Hwy. 36 to High Falls Dam	Recreation
Ocmulgee River	Georgia Hwy. 18 to Macon Water Intake	Drinking Water
Tobesofkee Creek	Lake Tobesofkee	Recreation

ALTAMAHA RIVER BASIN	CLASSIFICATION
All littoral waters on the ocean side of St. Simons, Sea, and Sapelo Islands	Recreation

SATILLA RIVER BASIN	CLASSIFICATION
All littoral waters on the ocean side of Cumberland and Jekyll Islands	Recreation

ST. MARYS RIVER BASIN	CLASSIFICATION
All littoral waters on the ocean side of Cumberland Island	Recreation

FLINT RIVER BASIN		CLASSIFICATION
Flint River	Woolsey Road (Fayette Clayton Counties) to Georgia Hwy. 16	Drinking Water
Flint River	Georgia Hwy. 27 to Georgia Power Dam at Lake Worth, Albany	Recreation
Flint River	Bainbridge, U.S. Hwy. 84 Bridge to Jim Woodruff Dam, Lake Seminole	Recreation

CHATTAHOOCHEE RIVER BASIN		CLASSIFICATION
Chattahoochee River	Headwaters to Buford Dam	Recreation
Chattahoochee River	Buford Dam to Atlanta (Peachtree Creek)	Drinking Water and Recreation
Chattahoochee River	Atlanta (Peachtree Creek) to Cedar Creek	Fishing[2]
Chattahoochee River	New River to West Point Dam	Recreation
Chattahoochee River	West Point Dam to West Point Mfg Company Water Intake	Drinking Water

3. Town Creek watershed upstream from the mouth of Jenny Creek.

Secondary:

1. Chattahoochee River watershed upstream from Georgia Hwy. 115 to the Georgia Hwy. 255 Bridge.
2. Little Tesnatee Creek watershed upstream from the mouth of Turner Creek.
3. Turner Creek watershed except as listed under primary above (Turner Creek nearest to Cleveland city limits).

WHITFIELD COUNTY

Primary:

None.

Secondary:

1. Coahulla Creek watershed upstream from Whitfield County Road 183.
2. East Armuchee Creek watershed.
3. Snake Creek watershed.
4. Spring Creek watershed.
5. Swamp Creek watershed upstream from Whitfield County Road 9.
6. Tiger Creek watershed.
7. Dry Creek watershed.

(15) **Waters Generally Supporting Shellfish.** Waters designated by the Coastal Resources Division as productive shellfish waters (currently producing or with the potential to produce shellfish) are opened and closed according to State Law and the requirements of the National Shellfish Sanitation Program Manual of Operations. For a current listing of open productive shellfish waters, contact the Coastal Resources Division. Specific water reaches generally supporting shellfish are as follows:

CHATHAM COUNTY

1. Savannah River South Channel at Fort Pulaski to confluence with Lazaretto Creek.
2. Tybee River at confluence with Bates Creek and eastward, including Bates Creek.
3. Wilmington River at confluence with Herb River and eastward.
4. Herb River at confluence with Wilmington River to County Road 890.
5. All waters surrounding Skidaway Island including Moon River North to Skidaway Island Road.
6. Vernon River at Vernonburg and eastward.
7. Little Ogeechee River from Rose Dhu Island and eastward excluding Harvey Creek on Harvey's Island.
8. Ogeechee River below Shad Island and eastward (north of center line).
9. All waters surrounding Ossabaw Island and Wassaw Island to the center line of the intracoastal waterway.

BRYAN COUNTY

1. Ogeechee River below Shad Island and eastward (south of center line).
2. Redbird Creek at Cottonham and eastward.
3. All waters west of main channel center line of intracoastal waterway to confluence of Medway River.
4. Medway River at south confluence of Sunbury Channel and East Channel and eastward (north of center line).

LIBERTY COUNTY

1. Medway River at south confluence of Sunbury Channel and East Channel and eastward (south of center line).
2. Dickinson Creek at Latitude 31° 44.2' to confluence with Medway River.
3. Johns Creek at end of County Road 3 and eastward to confluence with Medway River.
4. All other waters east and north of Colonels Island.
5. North Newport River System at confluence with Cams Neck Creek and eastward, including Cross Tide Creek.

6. South Newport River System north of center line and eastward from confluence with South Hampton Creek

MCINTOSH COUNTY

1. South Newport River System south of centerline and eastward from confluence with South Hampton Creek
2. Julienton River at Latitude 31° 35.8' and eastward to confluence with Sapelo River including Broad River near Shellman Bluff
3. Sapelo River from end of County Road 127 eastward excluding White Chimney River and Savannah Cut
4. All waters surrounding Creighton Island
5. Atwood Creek at Latitude 31° 28.3' and eastward.
6. Hudson Creek at Latitude 31° 27.2' and eastward.
7. Carnigan River at Latitude 31° 28.2' and eastward.
8. All waters surrounding Sapelo Island to the center line of Sapelo Sound including New Teakettle Creek, Old Teakettle Creek and Dark Creek.
9. Dead River at Longitude 81° 21.5' to confluence with Folly River
10. Folly River at Longitude 81° 21.2' to confluence with intracoastal waterways including Fox Creek tributary
11. North River from confluence with Old Darien River to confluence with intracoastal waterway including Old Darien River
12. Darien River from confluence with Three Mile Cut to intracoastal waterway
13. Rockdedundy River from confluence with Darien River to intracoastal waterway
14. All waters surrounding Doboy Island, Commodore Island, Wolf Island, and Rockdeundy Island
15. South River at confluence of intracoastal waterway to Doboy Sound
16. Altamaha River from confluence with Three Mile Cut and Mackay River and eastward including Buttermilk Sound but excluding South Altamaha River.
17. Dog Hammock to confluence with Sapelo River.
18. Eagle Creek to confluence with Mud River

GLYNN COUNTY

1. Mackay River water system from confluence with South Altamaha River to confluence with Brunswick River excluding Wally's Leg.
2. All waters surrounding St. Simons Island and Little St. Simons Island
3. All waters surrounding Andrews Island excluding Academy Creek.
4. Turtle River from confluence with Buffalo River to confluence with South Brunswick River, excluding Cowpen Creek, Yellow Bluff Creek, and Gibson Creek.
5. South Brunswick River and drainage system to confluence of Brunswick River.
6. Fancy Bluff Creek from confluence with South Brunswick River to the Little Satilla River
7. Brunswick River from confluence of Turtle River and South Brunswick River to St. Simons Sound
8. Little Satilla River from confluence with Fancy Bluff Creek to St. Andrews Sound (north of center line)
9. All waters surrounding Jekyll Island, Jointer Island, and Colonels Island.

CAMDEN COUNTY

1. Little Satilla River from confluence with Fancy Bluff Creek to St. Andrews Sound (south of center line) excluding Mauden Creek.
2. Umbrella Creek from confluence with Dover Creek below Dover Bluff.
3. Dover Creek from confluence with Umbrella Creek to confluence with Satilla River
4. Satilla River near Floyd Basin and unnamed cut over to Dover Creek to St. Andrews Sound
5. Floyd Basin at confluence with Todd Creek to confluence with Satilla River
6. Floyd Basin at confluence with Todd Creek to confluence with Cumberland River
7. Black Point Creek south of Latitude 30° 52.0' south to Crooked River

CESAS-OP-SR 18 Jul 97

MEMORANDUM FOR RECORD

SUBJECT: Recreation Designation of Terry Creek Vicinity

1. Today (18 Jul 97) I spoke with Nick Nicholson of Georgia's Department of Natural Resources and asked him whether any site in the Terry Creek vicinity qualified as a "major or designated water recreation area."

2. Nick noted that streams and reaches not listed in a specific category are classified as "fishing" for propagation of fish, etc. They sometimes also provide secondary contact recreation in and on water or for any other use requiring water of a lower quality. There is a recreation classification: general recreation which includes activities such as skiing, boating and recreation fishing.

3. He faxed me a copy of the Georgia regulations that defines this. Review of these regulations confirmed my belief that the site scorers' determination is in error.

Kathleen A. Morgan

KATHLEEN A. MORGAN
Environmental Compliance
Coordinator, Operations
Division

CESAS-OP-SR 31 Jul 97

MEMORANDUM FOR RECORD

SUBJECT: Fisheries in the Terry Creek Vicinity

1. On 25 Jul 97, I spoke with Susan Shipman, head of the Georgia Department of Natural Resources (DNR) office in Brunswick. I asked if there was a regulatory definition of "fishery." I noted that Black & Veatch had identified the Back River, Terry Creek and Dupree Creeks as three separate "fisheries" and I wanted to assess the validity of this.

2. Ms. Shipman noted that there was no commonly-used DNR definition for "fishery;" they would have to search for such a definition. We discussed fishing in and around Terry Creek and Ms. Shipman noted that commercial crab fishing occurred periodically. This is the only commercial fishing that occurs. In her judgment, the two creeks and river are a single fishery -- for crab. She noted there is some recreational fishing in Terry Creek and that Terry Creek is not a bait zone for the commercial bait harvest of shrimp.

3. When asked, Ms. Shipman informed me that Jim Music (referenced in B&V's record) is one of her staff members.

4. DNR's Carl Hall contacted me yesterday (30 Jul 97) and informed me that DNR had located a regulatory definition of "fishery." The Magnuson Fishery Conservation and Management Act defines fishery as "one or more stocks of fish that can be treated as a unit for purposes of conservation and management and which are identified as such on the basis of various characters; and, any fishing for such stocks." This confirms that B&V's determination was in error.

Kathleen A. Morgan

KATHLEEN A. MORGAN
Environmental Compliance
Coordinator, Operations
Division

1; 7 0469

DISPOSITION FORM

r use of this form, see AR 340-15; the proponent agency is TAGO

FERENCE OR OFFICE SYMBOL SAS-PD-S

SUBJECT Maintenance of Terry Creek, Brunswick Harbor

THRU ~~PD~~ ~~OP~~ 29 FEB 3/1

FROM PD-S

DATE 29 Feb 88 CMT 1

Niessen/jr/5799

TO OP-PN (Garrett)

1. Reference to your DF dated, 16 Sep 87, subject as above.

2. The attached report presents a description, evaluation, and recommendations concerning continued Federal maintenance of Terry Creek.

Atch

RICHARD A. HILL
Chief, Economic & Social
Analysis Br.

DA Form 2496-E
Jul 87

ECONOMIC ANALYSIS
TERRY CREEK, BRUNSWICK, GEORGIA
O & M JUSTIFICATION

Project Description

The Terry Creek Project was authorized under the River and Harbor Act of 1938, (House Document 690) for a channel 10 feet deep, 80 feet wide and 1.4 miles long. The project was completed in 1939. Maintenance dredging was performed during 1940, 1941, 1942, 1946, 1972, 1978, 1982, 1986, and 1987. Originally maintenance dredging was to be performed every two years.

Existing Conditions

A survey of the Terry Creek channel during January, 1988, revealed that shoaling had reduced controlling depth to about four feet. Average tidal range is about 7.5 ft., which provides 11.5 ft of water at high tide. Only two commercial users of the channel were identified during a recent field and telephone survey of the area. Recreational use of the channel could not be verified and is considered to consist of small boats using the creek on an infrequent basis.

Hercules Inc., is the primary user of the Terry Creek channel. This firm imports resin laden tree stumps from Bahamas, Mexico, and Belize on a self-propelled vessel 314 feet long, 44 feet wide having a maximum draft of 14 feet. A full load of stumps averages 1900 short tons resulting in a loaded draft of eleven feet. The vessel only navigates the channel at high tide during daylight hours, according to a Brunswick Harbor Pilot. The ship makes an average of eighteen trips per year for an average annual volume of 34,200 short tons of stumps. Once the stumps arrive at dockside they are fumigated for forty-eight hours with methyl bromide and then off-load to rail cars or stored in piles adjacent to the creek. The processing plant is across the street from the rail/storage yard.

Randy Spell Construction Company is the other commercial user of the Terry Creek Channel. This firm leases a small, creek side piece of property several hundred yards upstream of Hercules Inc. This firm uses a barge and the pushboat to haul dock pilings and construction materials for water side development. The barge is a 70'x32'x5' deck barge and pushboat is 37 ft. long with a 5 ft. draft. Prior to the 1987 dredging of Terry Creek, Mr. Spell indicated that his boat runs aground an average of 3 times a year resulting in damages of about $1,000 per grounding. Also, without the authorized channel depth his vessel would have to wait for higher tides and sometimes load materials at alternative sites. The estimated value of the delays and use of alternative

sites is $16,000 annually without channel maintenance. Mr. Spell said he could use a larger barge and push boat since his business is expanding. Also, he would like to start a boat repair business for medium to large private boats. The viability of these ideas depends on regular channel maintenance.

Maintenance Costs

Dredging in Terry Creek has become more regular during the last decade. The creek has been dredged three time since 1978 with an average annual removal rate of 87,621 cubic yards of material. At a cost of $1.16 per cubic yard, average annual dredging costs amount to $101,640. Disposal site preparation costs have been incurred during each of the last three dredging periods. In 1987, $250,000 was spent rebuilding the dikes and shaping the disposal site. No additional site work will be necessary until 1996 assuming two more deposits of material. At this time, the site will have to be reworked similar to the measures taken in 1987 in order to accept a third deposit. By 1998 the site would have to undergo extensive testing and study prior to attempting a fourth deposit. In this analysis, based on existing information, the site is considered to have a useful life of ten years with a $250,000 rehabilitation after eight years. The average annual value of site preparation is $19,770, using a 8 5/8 percent rate and the assumptions as stated earlier. There is another authorized disposal site close to the existing site, however it is currently inhabited by a variety of trailers and other structures. Furthermore, the dredged material from Terry Creek is contaminated with toxaphene and disposal in uncontaminated sites could pose environmental problems. Therefore, the period of analysis is limited to the remaining life of the existing site.

Maintenance Benefits

If maintenance on the Terry Creek Channel were to cease, Hercules would have to find an alternative site to deliver their stumps. There is an alternative site at the Brunswick Port Authority Dock a couple of miles across town. The additional costs associated with using the Port Authority facility include dockage fees (5 days/trip), stevedoring, temporary storage, loading charges and truck hauling to the Hercules plant or storage site. Hercules computed these extra charges at about $20/ton (not including any increased cost associated with use of methyl bromide at a new site). This amounts to an additional cost of $684,000 for stump transportation.

Maintenance benefits for the Randy Spell Construction Company amount to preventing damages and eliminating delays and alternative loading sites. The average annual value of these benefits are $3,000 and $16,000 respectively.

Summary

Average annual benefits and costs for maintaining Terry Creek are summarized as follows:

ITEM	AVERAGE ANNUAL VALUE
BENEFITS	
Extra shipping charges	$604,000
Delay elimination, loading problems	16,000
Damage prevention	3,000
Total	$703,000
COSTS	
Dredging	$101,640
Disposal site preparation	19,770
Total	$121,410

Benefit-to-cost-ratio 5.8 to 1

1987 prices and development, 8 5/8 percent rate, ten year period of analysis based on remaining life of current disposal site.

CONCLUSION

Continued Federal maintenance of Terry Creek should consider more than just the B/C ratio. The additional points to consider, among others, are:

1. Ninety-seven percent of the total benefits accrue to one company, who also happens to be responsible for the toxaphene in Terry Creek.

2. The dredged material is polluted and requires special handling/monitoring. This will result in continued extra charges for dredging the material.

3. The current disposal site is approaching capacity and is increasingly expensive to use. The alternative site has people living in it who will have to be relocated. This can be time consuming and expensive.

4. There will probably be some environmental concerns about contaminating another disposal site with the material from Terry Creek.

5. The channel seems to shoal up quickly after dredging. The channel was dredged to ten feet during the Spring of 1987 and within eight months had a controlling depth of four feet.

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration pathway Score (Sgw) (from Table 3-1, line 13)	Not Scored	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100	10,000
2b.	Ground Water to Surface Water Migration component (from Table 4-25, line 28)	Not Scored	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score. (would fall between 0.49 and 100)	100	10,000
3.	Soil exposure Pathway Score (S_s) (from Table 5-1, line 22)	~~8.47~~	~~71.82~~
4.	Air Migration pathway Score (S_a) (from Table 6-1, line 12)	Not Scored	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$	minimum: 0.24	maximum: 10,000 ~~10,071.82~~
6.	HRS Site Score -- Divide the value on line 5 by 4 and take the square root	50.18 must be recalculated	

See comments

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

Factor Categories and Factors			Maximum Value	Value Assigned	
DRINKING WATER THREAT					
Likelihood of Release					
1.	Observed Release		550	~~550~~	
2.	Potential Release by Overland Flow				
	2a.	Containment	10	--	
	2b.	Runoff	25	--	
	2c.	Distance to Surface Water	25	--	
	2d.	Potential to Release by Overland Flow [lines 2a x (2b + 2c)]	500	--	
3.	Potential to Release by Flood				
	3a.	Containment (Flood)	10	--	
	3b.	Flood Frequency	50	--	For dredged material disposal site, must calculate Potential to Release.
	3c.	Potential to Release by Flood (lines 3a x 3b)	500	--	
4.	Potential to Release (lines 2d + 3c, subject to a maximum of 500)		500	--	
5.	Likelihood of Release (higher of lines 1 and 4)		550		~~550~~ Presumed to fall between 1 and 500.
Waste Characteristics					
6.	Toxicity/Persistence		a	1,000	
7.	Hazardous Waste Quantity		a	100 ~~10,000~~	
8.	Waste Characteristics		100		18 ~~56~~
Targets					
9.	Nearest Intake		50	0	
10.	Population				
	10a.	Level I Concentrations	b	0	
	10b.	Level II Concentrations	b	0	
	10c.	Potential Contamination	b	0	
	10d.	Population (lines 10a + 10b + 10c)	b	0	
11.	Resources		5	~~0~~ ~~5~~	
12.	Targets (lines 9 + 10d + 11)		b		~~0~~ ~~5~~
Drinking Water Threat Score					
13.	Drinking Water Threat Score [(lines 5 x 8 x 12)/82,500, subject to a maximum of 100)		100		~~0~~ ~~1.87~~

0 x 18 x [Potential to Release] = 0

a Maximum value applies to waste characteristics category.
b Maximum value not applicable.
c Do not round to nearest integer.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
(continued)

Factor Categories and Factors		Maximum Value	Value Assigned	
HUMAN FOOD CHAIN THREAT				
Likelihood of Release			must be recalculated for dredged material disposal sites	
14.	Likelihood of Release (same value as line 5)	550		550
	Waste Characteristics			
15.	Toxicity/Persistence/Bioaccumulation	a	5.0E+07	
16.	Hazardous Waste Quantity	a	~~10,000~~	
17.	Waste Characteristics	1.00		.80 ~~560~~
	Targets			
18.	Food Chain Individual	50	45	
19.	Population			
	19a. Level I Concentrations	b	0	
	19b. Level II Concentrations	b	0.03 ~~0.09~~	
	19c. Potential Human Food Chain Contamination	b	6.0E-7	
	19d. Population (lines 19a + 19b + 19c)	b	0.09	45.03
20.	Targets (lines 18 + 19d)			~~45.09~~
	Human Food Chain Threat Score			
21.	Human Food Chain Threat Score [(lines 14 x 17 x 20)/82,500, subject to a maximum of 100)	100	would fall between 0.098 and 49.12	100
ENVIRONMENTAL THREAT				
	Likelihood of Release			
22.	Likelihood of Release (same value as line 5)	550		550

must be recalculated for dredged material disposal areas

[1] Maximum value applies to waste characteristics category.
Maximum value not applicable.
Do not round to nearest integer.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
(continued)

Factor Categories and Factors		Maximum Value	Value Assigned
ENVIRONMENTAL THREAT, (concluded)			
Waste Characteristics			
23. Ecosystem Toxicity/Persistence/Bioaccumulation		a	5.0E+08
24. Hazardous Waste Quantity		a	100 ~~10~~
25. Waste Characteristics		1,00	typo: was 10,000 320 ~~10~~ typo: was 10,000
26. Sensitive Environments			
26a.	Level I Concentrations	b	0
26b.	Level II Concentrations	b	100 ~~325~~
26c.	Potential Contamination	b	0
26d.	Sensitive Environments (lines 26a + 26b + 26c)	b	100 ~~325~~
Targets			
27. Targets (value from line 26d)			100 ~~325~~
Environmental Threat Score			
28. Environmental Threat Score [(lines 22 x 25 x 27)/82,500, subject to a maximum of 60]		60	would fall between 0.39 and 60 [60]
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED			
29. Watershed Score[c] (lines 13 + 21 + 28, subject to a maximum of 100)		100	would fall between 0.49 and 100 [100]
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE			
30. Component Score (S_{OF})[c] (highest score from line line 29 for all watersheds evaluated, subject to a maximum of 100)		100	would fall between 0.49 and 100 [100]

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

SOIL EXPOSURE PATHWAY SCORESHEET

Factor Categories and Factors		Maximum Value	Value Assigned	
RESIDENT POPULATION THREAT				
Likelihood of Exposure				
Likelihood of Exposure		550		550
Waste Characteristics				
Toxicity		a	1,000	
Hazardous Waste Quantity		a	10	
Waste Characteristics		100		10
Targets				
Resident Individual		50	50	
Resident Population				
6a.	Level I Concentrations	b	77.1	
6b.	Level II Concentrations	b	0	
6c.	Resident Population (lines 6a + 6b)	b	77.1	
Workers		8	0	
Resources		5	0	
Terrestrial Sensitive Environments		c	0	
Targets (lines 5 + 6c + 7 + 8 + 9)		b		127.1
Resident Population Threat Score				
Resident Population Threat (lines 1 x 4 x 10)		b		699050.00
RBY POPULATION THREAT				
Likelihood of Exposure				
Attractiveness/Accessibility		100	75	
Area of Contamination		100	5	
Likelihood of Exposure		500		25
Waste Characteristics				
Toxicity		a	1,000	
Hazardous Waste Quantity		a	10	
Waste Characteristics		100		10

SOIL EXPOSURE PATHWAY SCORESHEET
(continued)

Factor Categories and Factors	Maximum Value	Value Assigned	
NEARBY POPULATION THREAT, (continued)			
Targets			
18. Nearby Individual	1	0	
19. Population Within 1 Mile	b	0.5	
20. Targets (lines 18 + 19)	b		0.5
Nearby Population Threat Score			
21. Nearby Population Threat (lines 14 x 17 x 20)			125
SOIL EXPOSURE PATHWAY SCORE			
22. Soil Exposure Pathway Score[d] (S_s), (lines [11 + 21/] + 21/82500] subject to a maximum of 100)	100		8.47

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT CORPS OF ENGINEERS
P.O. BOX 889
SAVANNAH GEORGIA 31402-0889

REPLY TO
ATTENTION OF

September 15, 1997

Executive Office

SUBJECT: National Priorities List for Uncontrolled Hazardous Waste Sites, Proposed Rule No. 22, Published in Federal Register Volume 62, No. 62, Dated April 1, 1997, Terry Creek Dredge Spoil Areas/Hercules Outfall, Brunswick, Georgia

David Evans
Director, State and Tribal Programs and
State Identification Center
Headquarters, U.S. Environmental Protection Agency
5204G
Washington, DC 20460

Dear Mr. Evans:

I refer to the "Federal Register" Volume 62, No. 62, dated April 1, 1997, National Priorities List for Uncontrolled Hazardous Waste Sites, Proposed Rule No. 22. The above referenced proposed rule includes several sites for which the U.S. Army Corps of Engineers holds or held dredge disposal easement rights.

Please accept the enclosed comment package regarding the proposed listing of "Terry Creek Dredge Spoil Area/Hercules Outfall." In preparing these comments, our primary goal was to assure an accurate record is established and accurate scores applied. To this end, we have provided information and identified inaccuracies in the Hazard Ranking System Documentation Record that may not necessarily affect the overall score, but are pertinent to the factual history of the site. In an attempt to provide EPA and others with a better understanding of the actions and issues related to this site, we have also included explanations about dredging operations and confined dredged material disposal areas.

Per your requirements, I am enclosing the original and four copies of the comment package as well as a diskette containing an

electronic file of the comments in a format convertible to *WordPerfect 6.1*.

If you have any questions about these comments or about the dredged material disposal areas, or their management and history, please contact Kathie Morgan, Savannah District's Environmental Compliance Coordinator. Ms. Morgan can be reached by telephone at 912/652-5018 or by electronic mail at *kathleen.a.morgan@sasØ2.usace.army.mil*. She will be happy to set up a briefing of our comments for you if that proves desirable.

Sincerely,

Grant M. Smith
Colonel, U.S. Army
District Engineer

Enclosure

Copies Furnished:

Annie Godfrey
U.S. Environmental Protection Agency, Region IV
Atlanta Federal Center
100 Alabama Street
Atlanta, Georgia 30303

Leo Francendese
U.S. Environmental Protection Agency, Region IV
Atlanta Federal Center
100 Alabama Street
Atlanta, Georgia 30303

Tim Hassett
Hercules Incorporated
Hercules Plaza
1313 North Market Street
Wilmington, Delaware 19894-0001

Wayne Quinn
Hercules Incorporated
Brunswick Plant
Post Office Box 1517
Brunswick, Georgia 31521-1517

U.S. Army Corps of Engineers, South Atlantic Division
ATTN: CESAD-ET-CO, Bob Prince
77 Forsyth Street, SW.
Atlanta, Georgia 30335-6801

Headquarters, U.S. Army Corps of Engineers
ATTN: CECW-O, Charles Hess
20 Massachusetts Avenue, NW.
Washington, DC 20314-1000